

BENCHMARKS

The University of North Texas Computing Center Newsletter

VOLUME 11 NUMBER 6
September 1990

Welcome Back!

By Dave Molta, Director of Academic Computing Services (BITNET: MOLTA@UNT.VAX)

Another academic year is upon us and with it, another set of challenges are in store for the Academic Computing staff in our attempts to provide you with essential computing services. Many changes have taken place over the past year, and despite some rocky transitions, we feel the end result will be a research and instructional computing environment that provides the university community with a quality product we can all be proud of. This article provides an overview of the computing resources offered by Academic Computing Services, summarizes some of the changes that have taken place over the past year, and sets the agenda for improvements planned for the coming year.

Academic Computing Services Organization

The University of North Texas Computing Center works closely with the University Computing Council in recommending campus-wide computing policies with final approval for computing policies coming from the Computer Steering Committee. The Computer Steering Committee is composed of the UNT Vice Presidents chaired by the Provost.

The Computing Center is managed by Richard Harris, Associate Vice President for Computing and reports to Phil Diebel, Vice President for Fiscal Affairs. It is divided into three major areas. Administrative Computing, directed by Coy Hoggard, is responsible for administrative information systems. Academic Computing Services, directed by Dave Molta, is responsible for central academic and instructional computing support as well as central academic and administrative microcomputer software support. Computing Technical Services, under the direction of Steve Minnis, is responsible for mainframe systems support services, operations, and data communications.

Academic Computing Services is subdivided into four groups. The VAX/UNIX Systems group, managed by Billy Barron, provides central support for VAX/VMS

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Important Info. Inside!**

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SERVICES AVAILABLE TO USERS OF THE UNT COMPUTING FACILITIES

The UNT Computing Center is located in the Information Sciences Building (ISB), Room 119. Phone Numbers:

Computing Center: (817) 565-2324
Help Desk: (817) 565-4050
Micro Support: (817) 565-2316, 565-2319
Graphics Lab: (817) 565-3479
ISB I/O Area: (817) 565-3890
BA I/O Area: (817) 565-2350

All personnel listed below can be contacted either by calling the Computing Center or by sending them electronic mail on MUSIC/SP (ID-codes follow each name. All IDs are on BITNET node UNTMUSIC).

Benchmarks - Claudia Lynch (AS04)

Information & ID-Codes; Disk Space Problems - Theresa Russell

Statistical/Research Support - George Morrow (AS01), Panu Sittiwong (AC09), Phanit Laosirirat (AC44)

Academic ADABAS/COM-LETE - Cathy Hardy (AC55)

CRSP & COMPUSTAT Problems - Panu Sittiwong (AC09), Phanit Laosirirat (AC44)

Student Programming Problems - CSCI Dept., GAB Room 550; BCIS Dept., BARoom 152

Problems with JCL, Passwords, or Operating Systems; or Communication/Terminal Problems - Help Desk

Data Entry; Test Scoring & Analysis - Betty Grise

Administrative Applications - Coy Hoggard

Printout Retrieval - ISB or BA I/O Operators



DIALING-UP UNT COMPUTERS OVER THE TELEPHONE

Phone numbers for the Local Area Network (LAN) are:

300-2400 BAUD: (817) 565-3300
 300-1200 BAUD: (817) 565-3499
 300-9600 BAUD: (817) 565-3461
 300-9600 BAUD: D/FW METRO 429-6006, 429-9314

Area code 214 must dial 817 before the METRO #.

The numbers that accommodate multiple baud rates have an autobaud feature that requires you, once connection with the remote modem is made, to hit the <RETURN> key repeatedly so that the receiving modem can determine the appropriate baud rate. When you have established a communications link, the # prompt will appear on your screen and you can enter one of following CALL commands to connect with the computer of your choice.

CALL 8040 connects with the HDS/8083 (supports line editing or PCWS). Operating environments available are: MUSIC/SP, VM/CMS.

CALL 3270 connects with the HDS/8083 through a 3270 protocol converter (supports full-screen editing). Operating environments are: MUSIC/SP, VM/CMS, ADABAS/COM-LETE

CALL DEC connects with the VAXcluster (VMS)

CALL 780 connects with the Research VAX (Unix) *-Sequence 0448*

CALL 3000 connects with the Libraries' HP-3000 (Bibliographic database).

CALL 6800 connects with the NBI (Unix)

Communications Settings

LAN addresses	Data Bits	Parity	Stop Bits
DEC, 3000	8	N	1
8040, 3270, 780, 6800	7	E	1

HOURS FOR UNIVERSITY OF NORTH TEXAS COMPUTER ACCESS AREAS : Fall 1990*

Location	Days	Times
Computing Center RJE	Sunday Monday Tuesday-Saturday	Noon-Midnight 7 a.m.-Midnight <i>Mon</i> 7 a.m.-Midnight Sat. (Open 24 hours/day)
ISB 110 Terminal Area	Sunday Monday-Thursday Friday Saturday	1 p.m.-Midnight 8:00 a.m.-Midnight 8:00 a.m.-9 p.m. 9 a.m.-9 p.m.
College of Business	Sunday Monday-Thursday Friday, Saturday	Noon-11:45 p.m. 8:15 a.m.-11:45 p.m. 8:15 a.m.-7:45 p.m.
GAB 550C	Sunday Monday-Thursday Friday Saturday	4 p.m.-Midnight 8 a.m.-Midnight 8 a.m.-5 p.m. 2-8 p.m.
Graphics Lab	Sunday Monday-Thursday Friday Saturday	1 p.m.-Midnight 8 a.m.-Midnight 8 a.m.-9 p.m. 9 a.m.-9 p.m.
Willis Library	Sunday Monday-Thursday Friday Saturday	1 p.m.-Midnight 7:30 a.m.-Midnight 7:30 a.m.-9 p.m. 9 a.m.-9 p.m.

*Hours may vary. Check MUSIC/VAX News and/or posted schedules for exceptions.

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The primary central computing resources for academic computing at the University of North Texas consist of an IBM-compatible Hitachi Data Systems (HDS) Model 8083 dual processor mainframe computer running the VM/XA and MVS/SP operating systems and a Digital Equipment Corporation VAX Model 6310 minicomputer system running under VMS. Both MUSIC/SP and CMS are supported for interactive users of the HDS system.

and UNIX operating systems. The Academic Mainframe User Services group, managed by Dr. Philip Baczewski, is responsible for IBM VM/CMS and MVS, and MUSIC user support. The Microcomputer Software Support group, managed by Kyle Capps, is responsible for microcomputer software and network training and support. Finally, the Documentation Services group, managed by Claudia Lynch, is responsible for the publication of *Benchmarks*, coordination of short courses, and publication of site-specific computer documentation.

Hardware and Operating Systems

The primary central computing resources for academic computing at the University of North Texas consist of an IBM-compatible Hitachi Data Systems (HDS) Model 8083 dual processor mainframe computer running the VM/XA and MVS/sp operating systems and a Digital Equipment Corporation VAX Model 6310 minicomputer system running under VMS. Both MUSIC/SP and CMS are supported for interactive users of the HDS system. Two Hewlett Packard Model 2680A laser printers provide output for both the HDS and VAX systems.

Network Access

Access to the HDS, VAX and other computers is gained through a campus-wide cable television-based local area network (LAN), a campus Ethernet network, and through dial-in modems available to both local Denton users as well as users in the Dallas/Ft. Worth metroplex. UNT supports access to the BITNET and Internet wide area networks via a connection to the Texas Internet backbone in Dallas. In addition, access to other Texas governmental, educational, and research institutions is provided through both

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THEnet—the Texas Higher Education Network, and Sesquinet. The Computing Center, in cooperation with academic departments and administrative offices, also supports a campus-wide microcomputer network consist-

ing of approximately 40 file servers and over 1,000 microcomputers. Users of this system have access to a variety of services including gateways to host systems, laser printing, and CD-ROM systems.

Software and Training

Academic Computing Services provides support for most major programming languages on both the HDS and VAX systems. Supported statistical analysis packages include SAS, SPSS-X, BMDP, and MINITAB. Electronic mail facilities are available on the HDS and VAX systems for intra-campus communications as well as for communications with external organizations.

Academic Computing Services also provides support for a variety of microcomputer-based software applications. A wide variety of discounted and site-licensed microcomputer software packages, including communications software, statistical analysis packages, and numerous products from WordPerfect Corporation, are available to faculty for use on office microcomputers.

Academic Computing Services conducts regularly scheduled training classes covering both mainframe and microcomputer operating systems and applications. These classes are available at no charge to UNT faculty, staff, and students. In addition, special short

General access microcomputer laboratories housed in the Willis Library, Science Library, and Information Sciences Building basement are available for general use by all students and faculty.

courses can be arranged for specific classes for faculty wishing to incorporate computing into their courses.

Users who are experiencing technical problems in the use of computing systems can also take advantage of individualized consulting support from Academic Computing. While it is not possible for Academic Computing to actually write programs or perform computer-based statistical analyses for individuals, we will make our best effort to assist you in selecting the appropriate application to solve your computing problem and also help to troubleshoot problems.

Microcomputer Labs

General access microcomputer laboratories housed in the Willis Library, Science Library, and Information Sciences Building basement are available for general use by all students and faculty. These labs, which house both IBM-compatible and Macintosh personal computers as well as dot-matrix and laser printers, provide access to a wide range of microcomputer applications accessible over a high-speed local area network.

The Year In Review: 1989-90

The past year has been an active one for Academic Computing Services, and while much work remains to be done, we feel that the overall quality of computing services at UNT continues to improve annually. The following is a list of some of the major changes that have taken place over the past year:

- **Improvements in Academic Mainframe Environment:** In November, 1989, UNT acquired an additional HDS 8083 mainframe that was dedicated to academic computing, effectively doubling the mainframe resources available to the academic computing community. While limitations in the existing VM/SP operating system did not allow us to take advantage of the increased machine resources during the 1989/1990 academic year, we are confident that the benefits of this acquisition will be seen during the coming academic year. At the time that this article is being written, work is almost completed on a major conversion of the Academic HDS Mainframe to IBM's VM/XA operating system. This upgrade will allow us to take full advantage of the additional hardware resources available on the HDS system. Those of you who suffered through the degraded performance over the summer while the upgrade was taking place should see dramatic improvements in system response time.
- **Improvements in the Academic VAX/VMS Environment:** During the Fall, 1988 semester, the two VAX 11/785 minicomputers were replaced by a single

VAX 6310 minicomputer that offers a higher level of computing power and much better scalability. Unfortunately, the increased use of this system during the past year exceeded our expectations due to the fact that the acquisition of a companion UNIX processor was delayed. Nonetheless, the overall quality of the system has improved with the addition of more disk space, a network news application, and Novell's NetWare/VMS networking software. We are optimistic that the acquisition of a central UNIX processor during the coming year will result in the better performance due to the off-loading of some existing VAX users.

- **Expansion of Campus Microcomputer Network:** At this time last year, there were 24 Novell File Servers installed on campus connecting approximately 600 users. That number has now increased to 40 servers and over 1,000 users, making this network the largest such system installed at any university in Texas and one of the largest in the country. What is most exciting about this technology is that it encourages innovation and expertise in computing at the departmental level. The central computing organization takes on a role of facilitator, concentrating on issues such as the campus backbone and campuswide applications such as electronic mail while day-to-day computing services are provided at lower levels within the organization. This emerging infrastructure positions us very well for emerging distributed computing technologies of the 1990s.
- **Building Networks:** The renovations of Matthews Hall and Chilton Hall provided an opportunity for the university to deploy a vastly improved system for providing computer access to occupants of these buildings. Under the leadership of Vice Presidents, the Deans of Education and Community Services, as

During the coming academic year, additional improvements in campus computing will take place that will greatly enhance to university's ability to enhance productivity while at the same time improving our attempts to attract and retain high-quality students, faculty, and staff.

well as the diligent efforts of the Telecommunications Office, the Computing Center, and numerous departmental computer coordinators, an integrated voice and data communications system has been installed in both of these buildings, providing users with both telephone and computer connections in every office. This system is expected to provide reliable, high-speed connections at a speed of 10 million bits per second using the new 10BaseT Ethernet technology.

- **Enhancement of Microcomputer Labs:** The opening of the Willis Library Microcomputer Lab, a cooperative project between Academic Computing, Academic Affairs, and the Library, has resulted in a significant expansion of public-access microcomputer facilities available to students who cannot afford their own computer system. In addition, the microcomputer facilities in the Computer Graphics Lab, located in ISB 006, have been greatly enhanced through the combined efforts of the College of Arts and Sciences, the Department of Industrial Technology, and Academic Computing Services.

Projects Planned for 1990-1991

During the coming academic year, additional improvements in campus computing will take place that will greatly improve the university's ability to enhance productivity while at the same time improving our attempts to attract and retain high-quality students, faculty, and staff. Among the projects currently underway or planned for the coming year are the following:

- **Campus Fiber-Optic Communications System:** Work has already begun on the first phase of a new campus-wide fiber-optic communications network that will provide the platform for high-speed data communications and networking at UNT in the 1990s. Phase I of this project, which is scheduled to be completed by the end of September, will result in the connection of 15 buildings to a high-speed backbone. By the end of the coming academic year, most major buildings on campus will be connected to network routers at hubs located in the Information Sciences Building, Chilton Hall, and Matthews Hall. While the system will initially support Ethernet communications at a speed of 10 million bits per second, it has been engineered in a manner to support ultra-high speed FDDI communications technologies at a speed of 100 million bits per second. In addition, the hub arrangement will allow us to configure dedicated links between buildings on campus when necessary, thereby enhancing our ability to maintain consistent levels of performance across the backbone.
- **Enhancements to the Campus Microcomputer Network:** In addition to the installation of an improved backbone network, several enhancements are planned

for UNT's campus microcomputer network. A task force is currently developing a long-range plan for this system, but several projects have already been approved. First, we are planning to enhance the existing electronic mail services on this network to allow for the exchange of mail across servers as well as with other computing systems such as the VAX and UNIX systems, Macintoshes, and the BIT-NET/Internet wide area networks. Second, we are planning to enhance the performance of the SNA Gateway into the administrative computing system, which will result in dramatic improvements in file transfer between the mainframe and microcomputer systems. Third, the library is planning to implement a CD-ROM server that will provide users with access to extremely large databases over the network. Fourth, we hope that by the end of the current calendar year, we will be able to link our campus microcomputer network to the network installed at the Texas College of Osteopathic Medicine in Ft. Worth as well as to other similar systems at other universities around the state. Finally, plans are under way to secure a special university volume purchase arrangement with Novell that will allow all campus networks to upgrade to the newest revision of the NetWare 386 operating system which will support Macintoshes as well as TCP/IP network protocols.

- **Enhancement of Wide Area Network Connections:** In order to compete effectively in the 1990s, universities must provide faculty and students with access to national and international research and education networks. In addition to existing networks funded by the National Science Foundation, a major thrust is under way in Washington to fund the proposed National Research and Educational Network (NREN). UNT has recognized that

The university has recently made a major commitment to expanding the number of microcomputers available in campus open-access computer labs.

university resources must be dedicated to insure that we are well connected to both existing and emerging networks. Consistent with this, we have recently become affiliated with Sesquinet, the National Science Foundation supported regional network serving Texas. We also continue to be active participants in the Texas Higher Education Network (THEnet). The end result of our joining Sesquinet will be the installation of a high-speed, 1.544 million bit per second, link between UNT and the University of Texas at Dallas, which in turn is connected to Rice University in Houston over a similar connection. Since Rice University currently maintains the region's connection into the national NSFnet backbone network, UNT users will now have access to national networks at speeds equivalent to any other major university in the country.

- **Installation of a High-Performance UNIX Server:** The UNIX operating system is well entrenched as a computing platform at universities and research installations throughout the world and is expected to become increasingly important as a platform for commercial computing in the 1990s. UNIX computing systems are among the most cost-effective computing systems available on the market today, providing far superior price performance ratios for many applications when compared to proprietary mainframe and minicomputer systems. Academic Computing Services has been funded to acquire a high-performance UNIX server to support instructional and research

users on campus. While we have not yet selected a vendor for this system, our preliminary research indicates that we will be able to acquire a system offering somewhere between 16 and 40 million instructions per second. Possible applications of this system include numerical analysis, simulation, statistical analysis, and network file service, including support of graphical windowing terminals and workstations.

- **Additional Open-Access Microcomputer Labs:** The university has recently made a major commitment to expanding the number of microcomputers available in campus open-access computer labs. While the precise number and location of these labs is still to be determined, it is likely that somewhere between 60 and 100 additional computers will be made available for student use. As is the case with

- **Improvements to the Academic HDS Mainframe:** The Computing Center is expecting to make significant improvements in the Academic HDS Mainframe computing environment during the coming year. In addition to our move to IBM's VM/XA operating system, we are planning to acquire additional disk drives and several software packages that will result in significant improvements to the VM/CMS operating system environment. In addition, we hope to attach the mainframe system to the campus Ethernet, thereby providing high-speed file transfer capabilities as well as access to external networks.

- **Improvement in Metro-Line Dial-In Access:** Those of you who are dependent on accessing campus computing systems from the Dallas/Ft. Worth metroplex can look forward to expanded and more reliable dial-in services during the coming academic year. Through a cooperative arrangement with the University of Texas at Arlington, the metro lines currently located at the Texas College of Osteopathic Medicine in Ft. Worth will be replaced by at least 16 new lines to

Those of you who are dependent on accessing campus computing systems from the Dallas/Ft. Worth metroplex can look forward to expanded and more reliable dial-in services during the coming academic year.

existing labs supported by Academic Computing Services, all newly-acquired computers will include network connections to the campus microcomputer network as well as host computing systems.

be housed at UTA and dedicated for use by UNT students and faculty. These lines will not use the somewhat unreliable microwave communications system previously employed for metro line services. Rather, they will take advantage of

both the high-speed connection to UT-Dallas as well as a link between UT-Dallas and UTA. We are very optimistic that the new configuration will result in significantly enhanced reliability of these circuits as well as improved resolution should problems occur.

- **Enhanced After-Hours Support:** While a large portion of computing takes place after normal working hours, staff limitations have made it impossible for us to provide adequate after-hours support in the past. To address this problem, Academic Computing Services is planning to implement a dedicated help-desk during the coming year that will replace the existing ISB-110 help-desk services (and thereby freeing those personnel to manage the ISB 110 microcomputer lab) while at the same time providing dedicated after-hours support for nights and weekends. Personnel manning this new help desk will not only be responsible for responding to trouble calls, but they will also be responsible for continuous monitoring of all systems and networks on campus, thus allowing us to respond to system problems before they affect you.

If you are interested in acquiring additional information about central computing services at UNT, drop by the Computing Center in ISB 119. If you have any problems with the services we provide, please let us know and we will do everything we can to address your concerns. Once again, best wishes for a productive academic year. §

New Directions for the Academic Mainframe System ^{Rich}

Dr. Philip Baczewski, Academic Mainframe User Services Manager (BITNET: AC12@UNTVM1)

Mainframe computing has long been a key element of centralized academic computing on this campus. In fact, there was a time when it was the only element. The computing environment has grown to include many other platforms and the academic mainframe continues to be an important part of that mixture, serving needs for instruction in computing and statistics as well as research needs in areas spanning the disciplines of psychology, political science, music, finance, biology and many more.

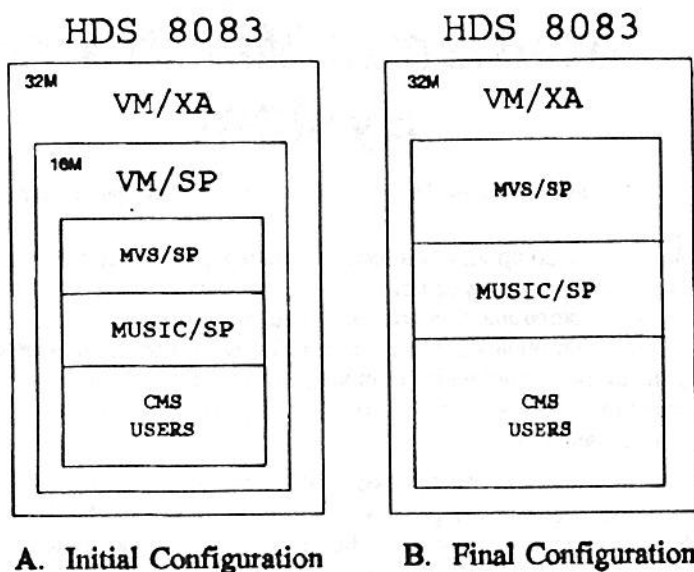
Academic mainframe computing received a windfall in the Fall of 1989, when an HDS 8083 was acquired to support administrative computing, freeing an entire HDS 8083 for academic use. The next challenge was to find a way to make complete use of that system's processing and memory resources. The solution was to install VM/XA as the host operating system replacing the older software technology of VM/SP. VM/XA is able to address the entire 32 Megabytes of the machine's working storage, whereas VM/SP was limited to a 16 Megabyte memory area. (Since VM/XA a 31-bit addressing scheme, it can potentially address up to 2048 Megabytes of real or virtual storage.)

The upgrade to VM/XA provides a dual-processor computing environment utilizing all resources of the HDS 8083. Performing this upgrade required a transition period which lasted all summer. Given the academic hardware and software configuration available, it was necessary to install a "starter" VM/XA system at the beginning of the summer, and to run the production VM/SP system under its control while configuring VM/XA to be the production VM environment. With three levels of operating systems in place (VM/XA, VM/SP, and MVS/SP) a performance degradation occurred at the lowest level (MVS/SP). This was only a temporary condition, however, and completion of the upgrade process should bring a noticeable improvement in response and turnaround on all IBM software systems.

VM/XA in Production

On August 15 and 16, the final phase of the upgrade to VM/XA was completed with the removal of VM/SP from the HDS 8083 system. The initial and final software configurations are shown in the "VM/XA Upgrade Diagram" on the following page. VM/XA is the primary operating system running on the HDS 8083 with 32 Megabytes of main storage. MUSIC/SP and MVS/SP are running directly under the control of VM/XA.

There are a few changes which were brought about with the upgrade. One very important difference is that the CALL 8040 command will now connect directly to MUSIC/SP, rather than to VM as in the past. This will mostly affect PCWS users who will need to acquire a new version of the *UNTCOM* exec if they normally use it to connect to the MUSIC system (see "New Version of PCWS UNTCOM Script" elsewhere in this issue.)



VM/XA Upgrade Diagram

Version 6.06 of SAS is being installed on CMS, replacing version 5.18. This new version of SAS has many exciting new features which promise to make it an even more powerful tool for data analysis. Academic Computing Services is planning some half-day faculty seminars for instruction in taking advantage of the new version's features.

On the Horizon

A upgrade of the MVS/SP is planned for some time in September. This upgrade will bring the MVS/SP system to an increased operational level, but will have very little impact on MVS users. To perform the upgrade, it will be necessary to shut down the MVS system for a two-day period. Details of any necessary down time will be announced in on-line news on all academic systems as the exact dates become known.

With the upgrade to VM/XA, work is proceeding to expand the use of the VM/CMS operating system. CMS offers a larger scope of interactive programming environments and a higher degree of wide area network accessibility than is possible on the MUSIC/SP system. We look forward to announcing exciting new mainframe facilities as they become available.

New Academic MVS Job Class and Execution Priority Structure

By Steve Minnis, Director of Computer Technical Systems and Dr. Philip Baczewski, Academic Mainframe User Services Manager (BITNET: AC12@UNTVM1).

MVS continues to be an important component of the academic mainframe processing environment at UNT. MUSIC users who create SPSS and SAS jobs submit them to MVS for batch processing. CMS users can also submit jobs to MVS and receive the output back to their virtual reader. Starting August 27, 1990, a new job class and execution priority structure will be in place for running jobs on the MVS/SP batch processing system. The new structure allows a greater efficiency in executing MVS jobs in UNT's current mainframe hardware and software environment.

MVS Job Classes

Because different jobs have different processing requirements, job classes are defined to control when and how many of a certain type of job can execute. These processing requirements include the amount of CPU time a job uses, the number of print lines generated, the use of one or more tape drives, and the exclusive use of a data set. The job class is specified on the "JOB card" of MVS JCL (Job Control Language) using the CLASS= parameter. This parameter can be omitted, in which case the job class defaults to CLASS=A.

The most noticeable change to the Job Class and Execution Priority structure is the change to the time and line limits for class A, B, C, and D jobs. These classes no longer depend upon an interaction between estimated CPU time and print lines. Instead, these jobs can use a CPU time estimate of up to 2 minutes and an estimate of up to 45,000 lines. If either of these limits are exceeded, a different job class must be specified. All job classes and their corresponding processing requirements are outlined below.

A new job class, CLASS=E, has been added to the class structure, allowing, exclusive use of a data set if necessary. The execution priorities have also been revised to reflect the new job class limits. A detailed description of these new priorities as well as a detail explanation of class E are found later in this article.

The Job Class Structure

The set of job classes are divided into two groups: those whose estimated execution time and estimated print lines are less than or equal to the defined limits (see *Notes on Job Class Specification* below), and those whose estimated execution time or print lines exceed the limit.

Classes falling into the first group (below the limits) are: A, B, C, D, and E.

CLASS	DESCRIPTION
A	The standard job class (and also the default, if no CLASS= parameter is specified). Supports no special processing requirements.
B	Allows use of one tape drive (only one tape mounted at a time).
D	Allows use of two tape drives simultaneously. Since these jobs use all of an available resource (tape drives under MVS), they are specially scheduled by the academic CPU operator. Typical turnaround is overnight, but during peak periods of the semester the turnaround time could be longer.
E	For jobs that must run single-threaded (see below for additional information), but otherwise would be class A or B. Allows the use of one tape drive. For jobs that would be class E but require two tape drives, use class D.
C	Used by jobs that must, for some reason, run stand-alone; that is, no other jobs are allowed to run at the same time. Use of this class requires prior approval by the Academic Mainframe User Services Manager. Class C necessitates that a SURF message be sent to the CPU operator indicating what special processing is required (number of tape drives, data sets used, etc.). ¹ Class C may use all system resources, including as many tape drives as can be made available under MVS (normally up to 4).

¹ SURF stands for Special User Request Facility and can be used on MUSIC, CMS, or COM-LETE by entering the SURF command (*SURF on COM-LETE). SURF allows a user to advise the CPU operator of the processing requirements of a job.

Continued on page 10.

Open-Access Computing Labs

By Randy Bell, Academic Network Support Coordinator (BITNET: Bell@UNTVAX)

Although there are many computing labs on the UNT campus, only three are currently open to the general student population: the University Libraries Lab, the ISB 110 Lab — which also houses the HELP DESK, and the Graphics Lab (More open access labs will be available within the next year — see the "Welcome Back!" article on page 6 of this issue for more information on these plans.). The other labs are associated with various schools on campus and are intended for use by the students of these schools. However, not all of the schools on campus have computing labs, thus the need for the "open-access labs". The open access labs are intended to compliment the "school labs" by providing students with computer time when the school labs are unavailable, and more importantly, the open access labs provide students and faculty of schools without computing labs access to the computing facilities at UNT.

Access to the HDS mainframe and the VAXcluster is available through all three public labs, with terminal access available from the Graphics Lab and ISB 110. Microcomputer software available in these labs is "standards-based" application software widely used in educational and corporate environments. Tutorials are provided when available and short course training sessions are held by the Academic Computing staff covering basic usage of some of the applications (Short

Continued on page 10

"Job Classes" continued from page 9.

Classes included in the second group (those that exceed the execution time limit or print line limit) are: J, N, and M. These jobs will be run as the processing load permits, typically over night. During peak times of the semester, execution of these jobs may be delayed by one or more days. These job classes require that the user submit a SURF message indicating the reason for the job to be class J, N, or M (i.e. a long run time or large amount of print output and the number of tape drives used for class N jobs). Class M jobs require prior approval by the Academic Mainframe User Services Manager.

CLASS	DESCRIPTION
J	Same resources as class A, but with an amount of CPU time and/or Print lines that exceeds the limit.
N	Same resources as class D or B, but with an amount of CPU time and/or Print lines that exceeds the limit.
M	Same as class C, but with an amount of CPU time and/or Print lines that exceeds the limit.

Notes on Job Class Specification

- The maximum execution time specifiable for "Group 1" classes (A through E) will be 2 minutes. During the months of April, May, and June, 1990, over 99% of all jobs executed in less than 2 minutes.
- The maximum print output limit will be 45,000 lines. A job with a class specification that conflicts with the limit on estimated time or lines will be cancelled automatically at read-on time. A job that exceeds its estimated time or lines while executing will be cancelled (automatically) at the time of the excess.
- Other than the print line limit discussed above, print lines will no longer be considered in determining job class. (The old formula, 3 times time plus print lines in thousands less than or equal to 45, will no longer be used.) However, the number of lines generated will continue to be considered when selecting the next job to actually print (see Job Execution and Print Priorities on the following page).
- A job that requires a SURF message may be cancelled off the input queue if a message is not received within a day of the job's submission.
- The default time limit estimate will be 30 seconds, when not specified in the JOB card. (The current default is 60 seconds). During the months of April, May, and June, 1990, approximately 95% of all jobs executed in 30 seconds or less.
- The default print line estimate will continue to be 2000 lines.
- Class L (for large memory jobs) will no longer exist. Any job may request a region size up to the maximum available; however, any job requesting large region sizes will be subject to review by the Academic Mainframe User Services Manager. The user may have to defend his or her region request. If large region requests become a problem, class L may be reinstated with little warning.
- The old classes I, G, and K will no longer be defined; they have had no practical distinguishing characteristics in a long time.

Continued on page 11.

"Labs" continued from page 9.

course information can be found on page 27 of this issue of *Benchmarks*.

Introductory handouts which cover basic usage of some applications are available at the Computing Center in room 119 of the Information Sciences Building and documentation is available in the labs (see the article on page 12 of this issue for more information about documentation). Additional software is being made available for use in the labs on a continuing basis.

The following information covers general guidelines and policies to follow when in the labs, lab locations, lab hours, currently installed software, and the number of personal computers, terminals and the printing facilities available in each lab:

Lab Policies:

- No foods or drinks are allowed in the Labs.
- During peak usage times, labs may impose a one hour usage time limit to insure that people waiting have an opportunity to use the labs.
- Be courteous of other people using the labs.
- Software copyright laws are in effect. DO NOT copy software available in the labs.
- The labs are to be used primarily for the completion of class assignments associated with UNT and not for any personal or business interests outside of the university. Students may use the labs to write resumes.

Continued on page 12.

"Job Classes" continued from page 10.

Job Execution and Print Priorities

Each job that enters the MVS input queue is given a numeric priority which is considered in determining when the job will be allowed to execute. Priorities range from 1 (lowest priority) to 15 (highest priority). Execution priorities "age" (increase) approximately every 30 minutes, so that even jobs with low priorities will increase in priority over time and eventually run. The following execution priorities will be in effect:

Time Estimate in Seconds	Execution % of jobs needing given estimate in 1990	Priority	April	May	June
1	10		6	6	7
2	9		12	14	9
3	8		17	26	8
5	7		25	18	18
10	6		19	15	32
20	5		15	11	16
30	4		3	5	4
60	3		2	4	4
>60	2		1	2	1

Note that if you choose to use the default, your job probably will execute to completion without "timing out" (based on the above statistics), but the execution priority will be near the bottom. It is in your best interest to estimate run time as accurately as possible.

When multiple jobs are waiting to be output on the same printer the number of lines generated are considered when selecting the next job to actually print. The following table represents this priority scheme which remains unchanged.

Lines to Print	Print Priority
500	10
1,000	9
2,000	8
3,000	7
5,000	6
10,000	5
20,000	4
45,000	3
>45,000	2

The New Class E

Some jobs are such that they must not be allowed to run at the same time that certain other jobs are running. For example, if one needs to link several load modules into a library, and does so with several jobs instead of one larger job, each of these must run "single-threaded;" i.e., no two or more running at the same time. If someone submits two or more of these at the same time as class A, two or more might run simultaneously, resulting in a data set enqueue problem or even a destroyed library.

Similarly, if two jobs needing the same tape volume are submitted by a single individual or by two different individuals, and if there are two class B initiators defined, one of the jobs would have to be cancelled or it would tie up a B initiator until the other finished.

In general, whenever two or more jobs that require exclusive use of the same resource might be submitted at the same time, whether by the same or different users, something must be done to insure that the jobs do not execute at the same time. Exclusive use of the same resource includes any access to a given tape volume, creating a new disk data set (DISP=NEW), and writing to an existing disk data set (DISP=OLD or DISP=MOD).

There are two problems associated with jobs creating the "waiting on data sets" condition as a result of the above situations. The first is that the system will have one, and sometimes several, initiators in a "wait state" until the job (or jobs) holding the needed data set terminates. None of those waiting initiators are doing any work, and the result is very likely to be reduced turnaround time for all other users of the system. The second problem is worse. If two resources are involved, it is possible to get into a "deadly embrace" in which two or more jobs are waiting on each other and none can proceed. In this case, the problem will never clear itself. These initiators will all be waiting until a CPU operator realizes the situation exists and cancels one or more of the jobs.

When any situations like those described above do or could exist, you should submit all the affected jobs as class E. This will result in all of those jobs running "single threaded" and will prevent unnecessary processing delays due to contention for data set resources.

"Labs" continued from page 10.

The University Libraries Lab

Location: Located in the southeast corner of the Willis Library, the only entrance to the lab is an outside entrance immediately to the left of the main entrance to the library. Please be aware. The doors to the lab are automatic and open to the outside

Lab Hours: Sunday - 1:00 PM to 12:00 AM
Monday through Thursday - 7:30 AM to 12:00 AM
Friday - 7:30 AM to 9:00 PM
Saturday - 9:00 AM to 9:00 PM

Available Software

MS-DOS Applications:

- WordPerfect 5.1
- PCWS
- Procomm
- Microsoft Works
- Lotus-123 2.2
- SAS/PC
- DrawPerfect 1.1 (Should be available in the fall.)
- Turbo Pascal 5.5
- Microsoft Word 4.0
- PlanPerfect 4.0
- SPSS/PC+
- Grammatik 4.0
- Sytek Gateway

Macintosh Applications:

- PowerPoint
- SuperPaint 2.0
- WordPerfect 3.1
- Microsoft Works 2.0
- Aldus Pagemaker
- Microsoft Word 4.0
- Hypercard

Computing Platforms

Network Operating System: Novell Advanced Netware 286

File Server: A CompuAdd 286 MS-DOS compatible PC.

Student Workstations: (20) CompuAdd 286 MS-DOS compatible PCs with VGA color graphics monitors, 1MB of RAM, one 360KB 5.25 inch floppy diskette drive and one 720KB 3.5 inch diskette drive.

(8) Apple Macintosh SEs with 1MB of RAM and one 720KB 3.5 inch diskette drive.

Printing Services: (3) Epson LQ-510 dot matrix printers.
(2) Apple Imagewriter dot matrix printers.
(1) Apple Laserwriter laser printer. (Should be available in the fall.)

Continued on page 13.

Documentation Available in the Computing Center

By Claudia Lynch, Benchmarks Editor and Documentation Services Manager (BITNET: AS04@UNTVM1)

Academic Computing Services is committed to providing quality services to the academic community here at UNT. Throughout this newsletter you will see references to various services available to faculty and students, and many cases, staff members. One of these services is the production and dispersal of free documentation on a variety of topics of interest to computer users on this campus.

The following documentation is available to faculty, staff, and students — when appropriate — in ISB Room 119 — the University of North Texas Computing Center main office. Please note that this list may not remain completely accurate for very long, since documents are continually being created and updated.

General Information

- *Software - What We Have and What We Support* (Revised 5/90): Mainframe Software Reference Material
- *Welcome to the University of North Texas Computing Center* (Revised 1/90): Open House Handout

Continued on page 13.

General Information

"Labs" continued from page 12.

(1) Hewlett Packard Laserjet III laser printer. The Laserjet printer is located in the Information Sciences Building and is accessible via the Novell campus wide network. Printouts are picked up from the I/O station located in the northwest corner of the ISB.

The ISB110 Lab

Location: The lab is located in the southeast corner of the Information Sciences Building in room 110.

Lab Hours: Sunday - 1:00 PM to 12:00 AM
Monday through Thursday - 8:00 AM to 12:00 AM
Friday - 8:00 AM to 9:00 PM
Saturday - 9:00 AM to 9:00 PM

The ISB110 lab is occasionally reserved for instructional purposes by the Computing Center. A notice will be posted on the door when a class is in progress. Please respect these notices and do not disrupt any classes.

Available Software:

MS-DOS Applications

- WordPerfect 5.1
- PCWS
- Microsoft Word 4.0
- PlanPerfect 4.0
- SPSS/PC+
- Grammatik 4.0
- Sytek Gateway
- Turbo Pascal 5.5
- DrawPerfect 1.1
- Procomm
- Microsoft Works
- Lotus-123 2.2
- SAS/PC
- RightWriter 3.1

Macintosh Applications:

- PowerPoint
- SuperPaint 2.0
- WordPerfect 3.1
- Microsoft Works 2.0
- Aldus Pagemaker
- Microsoft Word 4.0
- Hypercard

Computing Platforms:

Network Operating System: Novell Netware 386

File Server: An AST Premium 386 MS-DOS compatible PC.

Student Workstations: (15) CompuAdd 286 MS-DOS compatible PCs with monochrome graphics monitors, 1MB of RAM, one 360KB 5.25 inch floppy diskette drive and one 720KB 3.5 inch diskette drive.

Continued on page 14.

"Documentation" continued from page 12.

MUSIC/SP Reference Material

- *Personal Computer Workstation (PCWS) User's Guide* (Created 1986): MUSIC/SP Reference Material
- *Introduction to MUSIC/SP* Revised 9/89): MUSIC/SP Reference Material
- *Waterloo BASIC on MUSIC/SP* (Revised 4/87): MUSIC/SP Reference Material
- *Introduction to Personal Workstation (PCWS)* (Created 2/88): PCWS Short Course Computer Material
- *Introduction to MUSIC/SP VSAM* (Created 2/88): MUSIC 1.2 Reference Material
- *An Introduction to the Supervisor Privilege* (Revised 5/88): MUSIC/SP Reference Material for Instructors with class accounts.

CMS Reference Material

- *A User's Guide to Electronic Mail on CMS* (Revised 7/87): CMS Reference Material
- *Introduction to the Conversational Monitor System (CMS)* (Revised 2/90): CMS Short Course Reference Material

COM-LETE Reference Material

- *Notes on Using COM-LETE* (Revised 9/87): COM-LETE Reference Material
- *The COM-LETE Mail System* (Copyright 1983): Administrative COM-LETE Reference Material

Continued on page 14.

General Information

"Labs" continued from page 13.

(6) Apple Macintosh SEs with 1MB of RAM and one 720KB 3.5 inch diskette drive.

(2) ASCII terminals connected to the Sytek LAN for main-frame and minicomputer access.

Printing Services:

(2) Epson LQ-510 dot matrix printers.
(1) Apple Imagewriter dot matrix printers.
(1) Hewlett Packard Laserjet III laser printer. The Laserjet printer is located in the Information Sciences Building and is accessible via the Novell campus wide network. Printouts are picked up from the I/O station located in the northwest corner of the ISB.

The Graphics Lab

Location: The lab is located in the southwest corner of the Information Sciences Building in room 006. The only entrance to the Graphics lab is an outside entrance.

Lab Hours: Sunday - 1:00 PM to 12:00 AM
Monday through Thursday - 8:00 AM to 12:00 AM
Friday - 8:00 AM to 9:00 PM
Saturday - 9:00 AM to 9:00 PM

The Graphics lab is co-funded by the Computing Center and the School for Industrial Technologies and is used primarily for instructional purposes. The hours reserved for classes will be posted in the lab at the beginning of each semester.

Available Software:

MD-DOS Applications:

- WordPerfect 5.1
- PCWS
- Microsoft Word 4.0
- PlanPerfect 4.0
- SPSS/PC+
- Grammatik 4.0
- Sytek Gateway
- AutoCAD 1.0
- Turbo Pascal 5.5
- DrawPerfect 1.1
- Procomm
- Microsoft Works
- Lotus-123 2.2
- SAS/PC
- RightWriter 3.1

Macintosh Applications:

- PowerPoint
- SuperPaint 2.0
- WordPerfect 3.1
- Microsoft Works 2.0
- Aldus Pagemaker
- Microsoft Word 4.0
- Hypercard

Continued on page 15.

"Documentation" continued from page 13.

MVS Reference Material

- *Introduction to IBM Job Control* (Created 2/90): JCL Short Course Material

Statistical Packages

Miscellaneous

- *A User's Guide to the University of North Texas Computing Center Statistical Program Library* (Revised 9/75): Manual for old NTSU Statistical Procedures - Version III
- *File Handling in Selected Statistical Packages* (Revised 6/89): Statistical Package Short Course Material
- *Introduction to COMPUSTAT II* (Created 6/90): Statistical Reference Material

SPSS

- *Introduction to SPSS-X* (Revised 6/89): SPSS-X Short Course Material
- *SPSS/PC+* (Revised 10/89): SPSS/PC+ Short Course Reference Material

SAS

- *Introduction to SAS* (Revised 10/89): SAS Short Course Material
- *SAS-PC* (Created 4/89): SAS-PC Reference Material
- *SAS-PC Macro Language* (Created 4/89): SAS-PC Reference Material
- *SAS-PC Micro to Host Link* (Created 4/89): SAS-PC Seminar Reference Material

Continued on page 15.

General Information

"Labs" continued from page 14.

Computing Platforms:

Network Operating System: Novell Netware 386

File Server: An AST Premium 386 MS-DOS compatible PC.

Student Workstations: (20) Club 386 SX MS-DOS compatible PCs with VGA Color graphics monitors, 2MB of RAM, and one 1.2MB 5.25 inch floppy diskette drive.

(8) Apple Macintosh IIs with 2MB of RAM, color graphics monitor, 40MB fixed disk and one 1.44MB 3.5 inch diskette drive.

(8) ASCII terminals connected to the Sytek LAN for mainframe and minicomputer access.

Printing Services: (2) Epson dot matrix printers.
(1) Apple Imagewriter dot matrix printers.
(1) Apple Laserwriter laser printer.

(1) Hewlett Packard Laserjet III laser printer The Laserjet printer is located in the Information Sciences Building and is accessible via the Novell campus wide network. Printouts are picked up from the I/O station located in the northwest corner of the ISB.

Printouts from the Apple Laserwriter and Hewlett Packard Laserjet III printers are provided at 10 cents per page, which must be paid when the output is picked up at the ISB I/O station. The method of payment is a Laser Printing Card, which can be purchased from the Union Information Desk (at the same window tickets are purchased and checks are cashed), located on the third floor of the University Student Union. The Union Information Desk hours are 8 a.m. - 9 p.m., Monday through Saturday. Intra-Departmental Orders are accepted in the Computing Center Offices — ISB 119 — for the purchase of the Laser Printing cards. Lab assistants will not except any monies for printouts.

I will be placing suggestion boxes in each of the open access labs and will review any suggestions, criticisms, thoughts, ideas, etc., on a regular basis hoping to gain a better understanding of the computing needs of the students and faculty at UNT. Understandably, all entries in the suggestion boxes cannot be acted upon, but common needs should be identified and services made available to meet those common needs. Please do not hesitate to drop suggestions into the suggestions boxes. Chances are you are not alone in your needs. §

"Documentation" continued from page 14.

VAXcluster Reference Material

- *Introduction to VAX/VMS* (Revised 9/89): VAX/VMS Short Course Material
- *Introduction to Instructor Material on VAX/VMS* (Revised 6/88): VAX/VMS Reference Material for Instructors with class accounts.
- *Editing With EDT* (Created 11/88): VAX/VMS Reference Material
- *VAXcluster System Configuration* (Revised 8/90): VAXcluster Reference Material

Wide Area Network Reference Material

- *An Introduction to BITNET* (Created 9/87): BITNET Short Course Material
- *Making Connections* (Revised 4/90): Networking Reference Material
- *The Texas Higher Education Network* (Revised 7/90): THENET Documentation
- *The Internet* (Revised 8/90): Internet Reference Material
- *Accessing On-Line Bibliographic Databases* (Revised 7/90): On-Line Bibliographic Reference Material
- *ANU News Reference Guide* (Created 4/90): ANU News Reference Material
- *ANU News Users Guide* (Created 4/90): ANU News Reference Material

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"Documentation" continued from page 15.

Communications

- *Electronic Transfer of Text to Printing Services at the University of North Texas* (Revised 6/88): Sytek LAN Transfer Reference Material
- *Introduction to PROCOMM* (Revised 7/88): PROCOMM Short Course Material.
- *Using MS-Kermit* (Created 12/89): MS-Kermit Reference Material
- *Using the 3270 Protocol Converter at UNT* (Created 1/90): Mainframe Reference Material
- *Connecting PCs to Host Computers at UNT* (Created 6/90): Microcomputer Reference Material

Microcomputers

Microcomputer Networks

- *Academic Departmental Microcomputer Networks* (Created 5/89): Microcomputer Reference Material
- *Introduction to NOVELL NETWARE for Users* (Created 1/90): Novell Network Reference Material
- *Introduction to NOVELL NETWARE for Supervisors* (Created 2/90): Novell Network Reference Material

Operating Systems

- *MS-DOS In-depth* (Revised 11/89): Microcomputer Reference Material
- *Introduction to Microcomputers, DOS (Disk Operating System), and Hard Disk Management* (Revised 10/89): Microcomputer Reference Material

Text Processing

- *Advanced WordPerfect 5.0: Columns, Manuscripts, Graphics* (Created 4/89): WordPerfect Course Reference Material
- *Introduction to WordPerfect Version 5.0* (Revised 5/89): Microcomputer Reference Material
- *Advanced WordPerfect 5.0: Merge Capabilities* (Revised 5/89): Microcomputer Reference Material
- *Introduction to WordPerfect Version 5.1* (Created 5/90): Microcomputer Reference Material

Spread Sheets

- *Lotus 1-2-3* (Revised 5/89): Microcomputer Reference Material
- *Introduction to PlanPerfect 5.0* (Created 2/90): PlanPerfect Reference Material
- *Introduction to dBASE IV* (Created 2/90): dBASE IV Reference Material

WordPerfect Office

- *WordPerfect Office, Version 3.0: Shell* (Created 7/90): WordPerfect Office Reference Material
- *WordPerfect Office, Version 3.0: Scheduler Appointment Calendar* (Created 7/90): WordPerfect Office Reference Material
- *WordPerfect Office, Version 3.0: Mail* (Created 7/90): WordPerfect Office Reference Material.

New Version of PCWS UNTCOM Script Available

By Dr. Philip Baczewski, Academic Mainframe User Services Manager (BITNET: AC12@UNTVM1)

A new version of UNTCOM is available for down-loading from MUSIC/SP or for copying at the ISB 110 computer lab. This new version is necessary to support the change in the use of the CALL 8040 command. CALL 8040 now connects directly to MUSIC/SP rather than to VM as it did in before the VM/XA upgrade. It is still possible to log on "manually" using PCWS. Once you execute the TERM program and receive the PCWS page mode screen, if you are using a modem you will need to enter the command:

ATDT <number>, where <number> is the telephone number for the metro or local dial-up line you wish to use. If the telephone connection is successful, you should see a "CONNECT" message on your screen and you can then press the <RETURN> key a few times to get the pound sign prompt (#). You can then enter the command, CALL 8040, which will attach you to the MUSIC/SP system. Enter the following sign-on command:

/ID idnn PCWS;

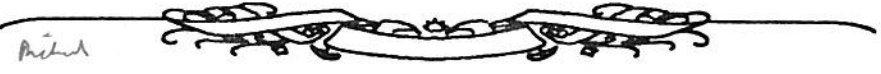
you should put your USERID code in place of idnn. You will be prompted for your password, and once that is entered correctly, you will be signed on to MUSIC.

If you wish to down-load the new UNTCOM script, once you are signed on using PCWS, enter the

Continued on page 23.



UNT Computing Center Policy and Procedure Highlights



This is a modified version of an article that appears yearly in Benchmarks.

Procedure for Obtaining User-ID Codes for Classroom Instruction

When applying for ID-codes for classroom use, we ask that faculty fill out one form for each class in which they need computer ID-codes. This form, which is blue, is called the "UNT Computing Center New User-ID Request Form," and is used to assign ID-codes for mainframe computers that are owned and administered by the Computing Center. The information on this form is entered into a computer database by our clerical staff. This database forms the input for a program which automatically assigns ID-codes and passwords on all of our computer systems. It is critical, therefore, that this form be filled out accurately and completely.

In addition to the faculty member's name and Social Security Number, there are several other important items on the blue Request Form. Instructors should indicate that they are requesting Classroom User-IDs, and specify the course information with department, course and section. Failure to provide this information will slow down the processing procedures.

The form also contains a space to indicate the number of students in the class. If this area is left blank, our program will assign user ID-codes to all students registered for that class. Each ID-code will be matched with the name of a student in the class as contained in the University student records database. At the beginning of each new semester, therefore, it would be wise to wait until most add/drops have been completed before requesting computer user ID-codes for classes.

The ID-codes will be composed of two letters and two digits. The two digits will start with 00, then 01, 02, etc. until the number is equal to the number of students in the class. The ID-code numbered 00 is in the instructor's name (for the instructor's use only), and each of the other codes is assigned to a student by name. Slips containing the ID-codes, passwords and names should be picked up by the instructor at the Computing Center Reception Area, located in the Information Science Building, Room 119.

If additional students are added to the class, the instructor should send a written memo to Theresa in the Computing Center, indicating the last number in the original range assigned. The required number will then be added, and may be picked up

shortly thereafter in the Computing Center. Likewise, instructors may cancel the ID-codes of students who drop the class by providing the student names and ID-codes in a written memo.

Under some circumstances, instructors may prefer that ID-codes not be assigned to each student by name. This may occur, for example, when students will be working only as teams, or when codes are needed before the class rolls are determined. Only in cases like these should instructors indicate the number of ID-codes required for the class. All these codes will be assigned in the instructor's name, and will range from 00 to the number requested. Once again, the 00 ID-code should only be used by the instructor.

Instructors should indicate on the Request Form the computers and operating systems required for the class. A MUSIC/SP or CMS User-ID is required to access most software on the IBM-compatible mainframe HDS/8083 computer, including those programs that run only under the OS/MVS batch operating system.

Normally, then, classes that use the IBM-compatible system will require OS/MVS batch ID-codes as well as MUSIC or CMS accounts. Classes which use the VAXcluster will also be assigned OS/MVS batch ID-codes, so that students may use the central printers in the ISB. *No class ID-codes will be assigned on the administrative portion of the NAS/8083 computer under any circumstances.* Classes which require access to the CMS operating system, or the COM-LETE teleprocessing monitor on the academic NAS/8083, must first have the approval of the Academic Mainframe User Service Manager.

Faculty should also fill in the departmental account number and department name. This information allows us to collect data on computer

usage by department and college which is useful in planning for future computer and software purchases.

The Request Form is not complete until it has been signed by both the faculty member and the account authority for the department. These signatures certify that the computing services requested are in support of University activities, and will not be used for commercial purposes or personal financial gain.

Obtaining an Individual ID-Code

Individual faculty and students may apply for an ID-code, which will be theirs to use for the entire fiscal year (September 1 - August 31). In order to obtain this type of ID-code, a "UNT Computing Center New USER-ID Request Form" (blue) must be completed and signed by the Account Authority for the particular department the individual is from. Students applying for an individual ID-code must also have the signature of a faculty sponsor.

The Responsibilities of Computer Use

Like most of life's other privileges, the privilege of being a computer user at UNT brings with it some responsibilities. These responsibilities involve two common things, courtesy and sense. Every computer user must comply with the following statement, which is signed by individual ID-code holders and Instructors who apply for classroom ID-codes. It is the Instructor's responsibility to inform their students about this when they pass out the ID-codes.

I hereby certify that to the best of my knowledge and intent, the computing services obtained through the use of this request form will be for the purpose indicated above and:

1. Will be limited to justifiable computing support of UNT/TCOM activities;
2. Will not be used for commercial purposes or financial gain.

I understand the unauthorized use of files or userids other than my own may be a violation of Texas State criminal law (see BENCHMARKS, for a more detailed description). Any unauthorized use of another user's program or data files will result in the loss of computing privileges and possible disciplinary or criminal action.

This means, among other things, that people who have classroom ID-codes, cannot use them for non-classroom work. There have been instances in the past of student violations with regard to the use of classroom ID-codes. These violations have included such things as using the computer to perform tasks in connection with an off-campus job, and using the mainframe laser printer to produce resumes. **BE FOREWARNED!** For a student, loss of computing privileges, *which could happen* when you do such things, could make it impossible to complete classroom assignments, or even an entire degree program. Furthermore, abuse of computing resources could result in the restriction of computing services *for the entire academic community.*

See related topic that follows . . .

Computer Crime and You: Know the Law

The Texas State Legislature amended Title 7 of the Penal Code, effective September 1, 1985 to include computer crimes. After providing definitions for such terms as 'communications common carrier,' 'computer,' 'computer program,' 'computer security system,'

'data,' and 'electric utility,' Senate Bill 72 goes on to state:

"Section 33.02. BREACH OF COMPUTER SECURITY.

(a) A person commits an offense if the person:

"(1) uses a computer without the effective consent of the owner of the computer or a person authorized to incense access to the computer and the actor knows that there exists a computer security system intended to prevent him from making that use of the computer; or

"(2) gains access to data stored maintained by a computer without the effective consent of the owner or licensee of the data and the actor knows that there exists a computer security system intended to prevent him from gaining access to that data

"(b) A person commits an offense if the person intentionally or knowingly gives a password, identifying code, personal identification number, or other confidential information about a computer security system to another person without the effective consent of the person employing the computer security system to restrict the use of a computer or to restrict access to data stored or maintained by a computer.

"(c) An offense under this section is a Class A misdemeanor.

"Section 33.03. HARMFUL ACCESS.

(a) A person commits an offense if the person intentionally or knowingly:

"(1) causes a computer to malfunction or interrupts the operation of a computer without the effective consent of the owner of the computer or a person authorized to license access to the computer; or

"(2) alters, damages, or destroys data or a computer program stored, maintained, or produced by a computer, without the effective consent of the owner or licensee of the data or computer program.

"(b) An offense under this section is:

"(1) a Class B misdemeanor if the conduct did not cause any loss or damage or if the value of the loss or damage caused by the conduct is less than \$200;

"(2) a Class A misdemeanor if the value of the loss or damage caused by the conduct is \$200 or more but less than \$2,500; or

"(3) a felony of the third degree if the value of the loss or damage caused by the conduct is \$2,500 or more.

"Section 33.04. DEFENSES. It is an affirmative defense to prosecution under Sections 33.02 and 33.03 of this code that the actor was an officer, employee, or agent of a communications common carrier or electric utility and committed the proscribed act or acts in the course of employment while engaged in an activity that is a necessary incident to the rendition of service or to the protection of the rights or property of the communications common carrier or electric utility.

If you are interested in seeing the text of the entire document, contact Claudia Lynch, *Benchmarks* Editor at 565-2324, or send electronic mail on either the VAX, CMS, or MUSIC to the ID-Code AS04.

After-hours Output Retrieval For Students In Wheelchairs

The following procedure is to assist students in wheelchairs to obtain output printed on the Laser printers after regular office hours.

During regular office hours (8 a.m. - 5 p.m., Monday through Friday), students in wheelchairs may enter through the Computing Center front office (Rm 119 ISB) and go through the hallway around to the Output boxes to retrieve their output. This office is closed after 5 p.m. on weekdays and at all times on weekends. At these times, please follow these steps.

1. ON MUSIC using LASER: Wait about 45 minutes after OSJR responds "JOB NOT FOUND", then call 3890 to see if your job has printed.
ON VAX using LASER: Wait about 50 minutes after submitting your job with the LASER command,

then call the Output Operator (at 3890) to see if your job has printed.

2. Output to the HP-LaserJet II or Apple Laserwriter II. Wait at least 15 minutes after you have sent your output to one of these printers, then call the Output Operator at 3890 to see if your job has printed.

3. When your job has printed, tell the Output Operator at 3890)
A. Your name, **B.** How many jobs you'll be picking up, **C.** Filing type specified on the output, **D.** That you're on your way over to pick up the output.

4. Come over to the ISB main entrance. Buzz the key-operated buzzer by the far right door, and come into the hallway by the door to ISB room 119.

The Output Operator on duty will have retrieved your printouts after your phone call. (S)he will listen for the buzzer as a signal to bring the printouts to you at the door of rm. 119, as soon as (s)he is able to do so.

To obtain a key to the buzzer: See Handicapped Student Services, in the Dean of Students Office.

Mainframe Job Processing Policy Reminder

Every semester brings with it new faculty and students and returning faculty and students who have had plenty of things to think about between semesters besides what the Computing Center job processing policies are. It is for this reason that it is probably a good idea to review some of the "biggies," as far as rules go ...

1) One of the most important rules is the 4 COPY RULE. That is, the maximum number of copies of a job to be

printed on any Computing Center printer is 4. Exceptions to this policy must be approved by the Associate Vice President for Computing or his authorized representative. **Violations will be reported to the appropriate Vice President.** This rule should be taken very seriously.

2) No more than 5 jobs can be submitted to the execution queue on the HDS/8083 by the same person at one time. Additional jobs will be canceled unless special permission has been obtained and Computer Operations has been notified. Permission may be gained by contacting Academic Computing Services (ISB 119, 8-5 M-F).

3) Jobs can have different classes, and if you misclassify your job it may be canceled. The article "New Academic MVS Job Class and Execution Priority Structure" on page 8 of this issue talks about this topic in great detail. Additional information about JOB processing policies can be obtained by entering **HELP OPER** from *GO mode on MUSIC/SP.

VAXcluster Processing Policies

- Any job using over 10 minutes of CPU time must be run in batch. Interactive jobs with this amount of CPU time may be canceled unless prior approval has been given by Academic Computing Services.
- No more than one batch job per VAX is allowed by the same person at one time. Additional jobs will be canceled or held unless special permission has been obtained from Academic Computing Services.
- All user files should be in the user's directory tree. Files written elsewhere on the system will be deleted unless approval has been granted by Academic Computing Services.

File Management Policy for CMS Spool Files

All CMS spool files will be purged after seven days. Spool files are CMS virtual reader, punch, and printer files which have not been received to your minidisk, or transferred elsewhere. For example, CMS mail is received in the form of reader files. This action is necessary to ensure that enough spool space will continue to be available.

File Management Policy For OS/MVS Disks

The following procedures are in effect for managing files on the academic disk packs.

ACAD00, ACAD01, ACAD02 and ACAD03

The volume ACAD01 is to be used solely for instruction by faculty and students in the College of Business. Faculty and graduate students who have data and programs used for research should store their files on ACAD00 or ACAD03. ACAD02 is available for all departments (not in the College of Business Administration) to store files.

- ACAD00 — faculty research
- ACAD01 — College of Business instruction
- ACAD02 — all other instruction
- ACAD03 — faculty research

All files on the volumes ACAD00, ACAD01, ACAD02 and ACAD03 which have not been accessed for the previous six months are deleted at the end of every long semester and before each fall semester. Users who have data

and programs on these volumes that are infrequently accessed should copy these files to tape.

Moving Datasets

You may use the utility program **MOVEDATA** to move a sequential or partitioned dataset from OS disk to tape, or from one OS disk to another. To access this program, type **MENU** in the *GO mode on MUSIC/SP. Alternatively, you can set up a batch run to execute the IBM utility **IEHMOVE** (which **MOVEDATA** uses).

SAS users should use Proc Copy to move SAS system files.

Users with VSAM or ISAM data sets are responsible for writing the appropriate programs to move their files.

OS Dataset Naming Convention

The naming convention for OS disk and tape data sets on the ACADemic HDS/8083 CPU is: **USER.myid.filename**

where:	USER. must appear myid — is your User-ID and must appear — must appear filename — is one or more optional fields (each of which may not exceed 8 characters) separated by periods.
--------	---

The total length of the dataset name may not exceed 44 characters.

If you are allocating a VSAM dataset, you should use the high-level qualifier of **USRV.** instead of **USER.** If a job attempts to create or access a dataset that does not have a proper high-level

qualifier, the job will fail with a JCL error, and the following message will appear in the messages area of your output:

```
IEF720I jobname ddname - USER NOT
AUTHORIZED TO DEFINE THIS DATA SET
```

Tape data sets should also follow the above naming convention. Catalogued datasets will be deleted if they do not follow the proper convention.

Processing Tapes on the HDS/8083

Tape processing on the HDS/8083 is accomplished through a tape management system (TMS), which provides users with protection against inadvertent loss of tape data and manages the many tapes in the Computing Center's tape library. In order for the TMS to be effective, it must control all the tapes that are being processed. To accomplish this, people who own tapes that they want to access must have them copied onto a tape controlled by the TMS. The only exception to this rule is if you want to access a foreign tape (a tape that doesn't belong to the TMS) "just one time." This might be the case if you want to copy files from a tape onto disk. In all other cases, you cannot access data contained on a tape unless it resides on a TMS volume. The OPER help file on MUSIC has a good overview of the Tape Management System here at UNT. To read it, enter **HELP OPER** from MUSIC *GO mode and follow the instructions.

Following are some procedures to follow to process tapes on the HDS/8083:

GENERAL INFORMATION

CONDITION ACTION

Copy Tape Bring tape and any onto TMS documentation

about it to the Computing Center Reception Area (ISB 119). Fill out the BLUE form for copying Foreign tapes onto the TMS.

Copy TMS volume to personal tape

If necessary, find out what the requirements are for tapes at the location you are planning to process your tape. Bring your personal tape to the Computing Center Reception Area (ISB 119). Blank tapes may be purchased here, also. Fill out the GREEN form for copying TMS volumes onto Foreign Tapes.

Copy files from personal tape to disk

Bring your tape to the Computing Center high security area (GAB 5th floor - take the northeast staircase). Run your job (remember to send a SURF message telling the operator to process your tape). When you are through, and are sure your job worked, return to the high security area to pick up your tape.

O.K. with you to name your files
USER.yourid.FILE001 to
USER.yourid.FILE00n.

The tape management system keeps track of what is going on with its tapes through the tape management catalog (TMC). The TMC is updated each time a tape is mounted and dismounted, and contains the following information:

- Volume Serial
- Record Format
- Blocksize
- Expiration Date
- Tape Density
- Dataset Name
- Logical Record Length
- Jobname/Stepname Creating File

The TMS allows users to specify retention periods and expiration dates for their tapes (expiration dates are calculated, if a retention period is specified). The default retention period is 180 days. Each file on a tape has an expiration date associated with it. If the tape is a copy of an outside (foreign) tape, all the datasets (files) on the tape will have the same expiration date. If the tape consists of files that have been added over time, each file will have a different expiration date. A TAPE WILL NOT EXPIRE, UNTIL ALL THE FILES ON IT HAVE EXPIRED!

While this may be a comforting thought, do not be lulled into blissful abandon. Unless you are continually adding files to your tape, it will expire

Perpetual Julian Date Calendar (Non Leap Year*)

Day	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Day
1	001	032	060	091	121	152	182	213	244	274	305	335	1
2	002	033	061	092	122	153	183	214	245	275	306	336	2
3	003	034	062	093	123	154	184	215	246	276	307	337	3
4	004	035	063	094	124	155	185	216	247	277	308	338	4
5	005	036	064	095	125	156	186	217	248	278	309	339	5
6	006	037	065	096	126	157	187	218	249	279	310	340	6
7	007	038	066	097	127	158	188	219	250	280	311	341	7
8	008	039	067	098	128	159	189	220	251	281	312	342	8
9	009	040	068	099	129	160	190	221	252	282	313	343	9
10	010	041	069	100	130	161	191	222	253	283	314	344	10
11	011	042	070	101	131	162	192	223	254	284	315	345	11
12	012	043	071	102	132	163	193	224	255	285	316	346	12
13	013	044	072	103	133	164	194	225	256	286	317	347	13
14	014	045	073	104	134	165	195	226	257	287	318	348	14
15	015	046	074	105	135	166	196	227	258	288	319	349	15
16	016	047	075	106	136	167	197	228	259	289	320	350	16
17	017	048	076	107	137	168	198	229	260	290	321	351	17
18	018	049	077	108	138	169	199	230	261	291	322	352	18
19	019	050	078	109	139	170	200	231	262	292	323	353	19
20	020	051	079	110	140	171	201	232	263	293	324	354	20
21	021	052	080	111	141	172	202	233	264	294	325	355	21
22	022	053	081	112	142	173	203	234	265	295	326	356	22
23	023	054	082	113	143	174	204	235	266	296	327	357	23
24	024	055	083	114	144	175	205	236	267	297	328	358	24
25	025	056	084	115	145	176	206	237	268	298	329	359	25
26	026	057	085	116	146	177	207	238	269	299	330	360	26
27	027	058	086	117	147	178	208	239	270	300	331	361	27
28	028	059	087	118	148	179	209	240	271	301	332	362	28
29	029		088	119	149	180	210	241	272	302	333	363	29
30	030		089	120	150	181	211	242	273	303	334	364	30
31	031		090		151		212	243		304	335	365	31

*For leap years (1992, 1996, etc.) add a day on February -060- thus incrementing all the following dates by one.

NOTE: If you have a non-labeled tape and don't want to write dataset names, the Tape Librarian will assume it is

eventually. An expired tape is AUTOMATICALLY returned to scratch tape status, ready to be written over at a moments notice. To keep on top of things, occasionally (once every couple of months or so), run the following job:

```
//JOB CARD <—A Valid job card
// EXEC TMSINFO
//SYSIN DD *
VOL=tapevolume<—Your TMS tape #
/*
```

This will inform you of the status of the various files on your tape(s). It should be noted that the expiration dates (EXPDT=) reported by this utility are specified as Julian Dates. The table provided in this article should aid you in deciphering the expiration date(s) of your file(s).

Should the need arise, the TMC can be updated online or through batch by authorized personnel. If, for example, you wanted to change the expiration date of a tape, this could be accomplished by an update to the TMC. To request an update of the TMC, submit a TMS Update Form (available from the Computing Center, ISB 119) to a member of the Academic Computing staff. The staff member will assist you in completing the TMS Update Form and will make arrangements with the Computer Operations Tape Librarian to process the TMS update request. Run the TMSINFO Utility (shown above) three days after submission of the form to verify that the update has taken place.

For more information on the Tape Management System, type **HELP OPER** while in ***GO** mode on **MUSIC/SP** and follow the instructions.

Turnaround on the Hewlett-Packard 2680A Laser Printers

The Hewlett-Packard 2680A Laser Printers provide high quality computer-generated output with the flexibility of different character styles (fonts) and various character per inch settings. These printers serve users from the HDS/8083 and the VAXcluster. The laser printers print an average of over 5.5 million lines each week – more than ten times as much as any other Computing Center printers.

The HP-3000 system through which the laser printers are accessed serves all users on a first-come, first-served basis. All jobs routed to the Laser go through the steps described below:

When you route a print job to 'REMOTE 4' (or 'LASER') or 'REMOTE1' (or 'BA') using MUSIC/SP, the VAX, COM-LETE, or CMS, your job is placed on an output queue for that Remote. At this point a MUSIC user in OSJR would receive information similar to the following:

```
JOB 299 ID32PRT OUTPUT READY -
ROUTE n 200 LINES
```

When your job is next in line to print, it is sent down a communications line from the mainframe to the HP 3000 system. Each half of the HDS/8083 has a communications line to the HP, so jobs spool to this system simultaneously from the ACAD and ADMN portions of the HDS/8083.

After a print job has been sent to the HP-3000 system via this communications line, the mainframe no longer has any record of the job. At this point, a MUSIC user would receive "JOB NOT FOUND" when querying OSJR for the status of his job. Keep in mind that at this point the job has NOT printed – it may be from 45 minutes up to several hours before it prints, depending on the

volume and length of jobs already transferred to the HP-3000 system.

When your job is transferred to the HP-3000 it is placed on an output queue for one of the Laser printers. Jobs from both mainframes are placed on this queue for REMOTE4 in the order received – neither system has "priority". When your print job is first in line on the REMOTE1 or REMOTE4 system queue, it will be printed on the appropriate laser.

The apparent delay for users of the laser printers is caused by the number of jobs waiting to print on the HP system. Since this system receives output from multiple Host computers (the HDS/8083 and VAXcluster), it runs almost constantly during the day and night printing output as it is received. For a MUSIC user, a job may spool over to the HP system in five minutes or less. However, once transferred to the HP this job may be 125th in line, which means it will be at least an hour or more before it prints, depending on the size of the jobs preceding it.

To avoid waste of computer resources and needless increase of turnaround on the lasers, use the laser printers only when you really need it – otherwise:

- Thoroughly proof read and test jobs before requesting copies.
- Abide by the limit of 4 copies printed by any method. Use copy machines or the Copy Centers for further copies.
- Allow enough waiting time before you go to the ISB to retrieve your Laser output – 45 minutes at the least. Toward the end of the semester (last 4-5 weeks) it usually takes several hours.
- Check the "LASER PRINTER STATUS" board kept in the ISB Output window for a current estimate of REMOTE4 Laser turnaround time or type PSTATUS from MUSIC *GO mode to see a status display for all remote printers.

Consulting On Pirated Software

It is the policy of the Computing Center that no consulting will be done with users on microcomputer software that we know or have reason to believe is pirated. "Pirated" means that the software is being used in violation of the license agreement with the company that produced the software. So ... if you copy someone else's software and can't run it on your micro, don't come to us. §

"PCWS" continued from page 17.

following command:

XTPC UNTCOM.SCR -r

This will replace the version of UNTCOM which is in your PC's PCWS directory or diskette. (If you are downloading to a different directory, remember to copy the new version of UNTCOM.SCR to your PCWS directory or diskette.) If you have any questions about the above, please contact the Computing Center Help Desk at 565-4050 or drop by the ISB 110 computer lab for hands-on help. §

Where: filename is the name of your COBOL source program and options are compiler options you need to have in effect (see OS/VS COBOL Compiler and Library Programmer's Guide)

To invoke the COBOL II compiler:

COBOL2 filename (option, option,...

Where: filename is the name of your COBOL source program and options are compiler options you need to have in effect (see VS COBOL II Application Programming Guide)

If you are unable to compile your program due to insufficient storage for compiler processing, do the following:

DEFINE STORAGE 2M

IPL CMS

Press <ENTER> to return to Running mode. This will give you more space until you log off.

Alternative Computing Environments: COBOL on CMS

By Cathy Hardy, "Academic Database Queen" (AC55@UNTVM1)

Trying to get a "clean" compile of your COBOL or COBOL II program? Want to save time? Don't ship it to MVS to compile — debug and compile it interactively on CMS! The following steps will guide you through this process. CMS commands are shown in bold.

1. Create the COBOL or COBOL II source code file using XEDIT. The filetype must be COBOL.

XEDIT filename cobol a
File (save) the source code.

2. Create the data file to be used as input for your COBOL program. The filetype is DATA.

XEDIT filename data a
File (save) the data.

3. No special link is needed to access the COBOL II compiler, but to use the OS/VS COBOL Release 2.4 compiler type: **NTLINK COBOL**

To release your link to the COBOL compiler so you can use the COBOL II compiler, type: **NTLINK COBOL REL** or **logoff** (if you logoff, you will need to log back on).

4. To invoke the COBOL compiler, type: **COBOL filename (option, option,...**

Look in your FILELIST for the results of your compilation. Type: **filename LISTING A**

The LISTING file will contain error messages and diagnostics from the compilation. You can generate a complete listing of compiler diagnostic messages and codes, as well as their explanations, by compiling a program with the PROGRAM-ID changed to the name ERRMSG.

Once the source has compiled successfully, CMS creates an object file with the filename of your source program and a filetype of TEXT.

You save time (yours and CPU) by debugging your source code on CMS instead of shipping the code to MVS, compiling, and shipping it back. And, best of all, you aren't stuck in a long input queue since you are running a virtual machine. §

Statistical Software at UNT

By Panu Sittiwong, Academic Computing Consultant (BITNET: PANU@UNTVM1)

With the increasing support of the CMS operating system on the HDS 8083 mainframe, Academic Computing Services also plans to make some changes in the statistical software available. The table below represents the software available currently and under the new configuration. Please note that the table only points out changes. If the statistical software that you currently use is not listed in the table, you will be able to use that software in the same manner you are doing now.

In order to have our statistical software users make a smooth transition from MUSIC/SP and OS/MVS to VM/CMS, Academic Computing Services will offer a couple of half day workshops on SAS. The workshops are tentatively scheduled to be held during Friday afternoons and weekends. Staff members will be also be available to conduct a special workshop for any classes that might use any of the software listed below. Contact the Computing Center (565-2324) if you would like to have a workshop for your class.

Microcomputer based Statistical Software.

SAS/PC and SPSS/PC+ software will continue be available to faculty and staff or to be installed on any university

owned microcomputer and Novell file server. In addition the Computing Center is in the process of acquiring a site license for SPSS for the Macintosh. Our license agreement with SAS Institute and SPSS Inc. do not allow the Computing Center to distribute the software to students. However, SPSS/PC+ Studentware is available from the UNT University Store at a cost of \$37.95. UNT students can also get a copy of Microcrunch free of charge by bringing two formatted 360K diskettes to the ISB 110 Lab.

In order to have either SAS/PC or SPSS/PC installed, contact the Computing Center at (817) 565-2324. Before they can be installed in your PC, you need to have a minimum of 11m of harddisk space available and the following conditions must be satisfied.

Software	Currently Available		Planned Configuration	
	OS/MVS	VM/CMS	OS/MVS	VM/CMS/XA
SAS:				
Base	Yes	Yes	Yes	Yes
Stat	Yes	Yes	Yes	Yes
IML	Yes	No	Yes ¹	Yes
ETS	Yes	No	Yes ¹	Yes
OR	Yes	No	Yes ¹	Yes
Graph	No	Yes	No	Yes
SPSS-X:				
Base	Yes	No	Yes	Yes ²
Adv. Stat	Yes	No	Yes	Yes ²
LISREL	Yes	No	Yes	Yes ²
BMDP:				
BIMED	Yes	No	Yes	Yes ²
EQS	No	No	No	Yes

¹SAS/IML, OR, and ETS version 5.18 will be available under OS/MVS until the end of November. If you are using any procedure under these modules, you will need to convert your SAS program to SAS under CMS by that time. The majority of programs will run under CMS without any changes., however, some programs may require minor changes.

²SPSS-X, LISREL, and BMDP are planned to be installed on CMS/XA during the Fall Semester.

1. Must be classified as full-time faculty or staff at UNT. This includes instructors, but not teaching fellows, teaching assistants, or research assistants.
2. The PC which the software will be installed in must belong either to UNT or faculty or staff who requested the software.

3. If the software is to be installed on a PC which will be used at home, it must be removed when you resign from UNT. Faculty or staff may check-out the installation diskettes from the Computing Center for 2 days in order to install the software on their home machines.

- **SPSS/PC:** Currently, we have version 3.1 of SPSS/PC+ available. It includes the BASE, ADVANCED STATISTICS, TRENDS, TABLES, and GRAPHICS modules. SPSS/PC+ GRAPHICS requires you to have Microsoft Chart, Chart Master, or Harvard Graphics installed on your microcomputer as well.

- **SAS/PC:** The current version of SAS/PC is 6.04, and we have the BASE and STAT modules available. A limited number of copies of IML, OR and GRAPH are available.

- **MICRO CRUNCH:** Micro Crunch is a lesser known statistical software package compared to SAS/PC and SPSS/PC. It provides most of the statistical procedures available on SAS/PC and SPSS/PC, however, it does not require a lot of harddisk space. The software is contained on two 360K floppy disks. It is easy to learn and use, and is available to all faculty, staff, and students who use the software for class-related projects. To obtain Micro Crunch, you need to bring two formatted 360K floppy diskettes to the Computing Center 110 ISB Lab.

Mainframe - VS - Micro: Which one should I use?

The choice to run your statistical analysis on either mainframe or microcomputer is for the most part a matter of personal preference. Both SAS/PC and SPSS/PC are pretty similar to their counter-parts on the Mainframe. In fact, SAS data and programs for the Mainframe will run on the PC version with no or minor modification. SPSS, on the other hand, has a procedure to convert program code and data from PC to Mainframe and vice versa.

Both platforms provide different advantages and disadvantages to users. This section will try to point out some of those advantages and disadvantages in order to help you make a selection on the platform that will be best for you.

The Microcomputer Platform

Both SAS/PC and SPSS/PC+ provides several advantages to users. These include:

- SPSS/PC+ provides a Menu system which you can use to compose SPSS/PC+ programs. This helps to minimize syntax errors for new users. It is possible for a novice user to compose a SPSS/PC+ program without opening a manual
- Both SAS/PC and SPSS/PC+ provide excellent on-line help systems. All commands and syntax can be acquired from the help command.
- Both systems have procedures which will allow you to incorporate the output into some other microcomputer program. For example, a Table Procedure in SPSS/PC+ or PROC Tabulate in

SAS/PC are capable of producing a customized table for your data. The output can be directly included in Word Perfect.

- Graphic output from both packages can be directly incorporated into WordPerfect or DrawPerfect

A major disadvantage of the microcomputer platform is its limited memory utilization. Under the MS-DOS operating system, SPSS/PC+ can only use up to 64K of Expanded Memory in addition to the conventional 640K RAM. This results in a limit to the number of variables which you can use in SPSS/PC+. Currently, SPSS/PC+ has a limit of 500 variables. In addition, some procedures which may require a large working space may not be able to perform with SPSS/PC+. SAS/PC, on the other hand, can use up to 2M of Expanded Memory in addition to the conventional 640k RAM. Thus it is more flexible.

Another disadvantage of using the microcomputer products is related to the amount and location of your data. If, for example, you are using data stored on tape, (eg. data from ICPSR, CRSP, and COMPUSTAT data), you will be required to subset the data set before it can be used with SAS/PC or SPSS/PC+.

VM/CMS and OS/MVS Platform

As mentioned above, these statistical packages are available on either OS/MVS or VM/CMS or both. In some cases, you may not have any choice but to run your statistical analysis on the mainframe under one or another operating system. Where a choice is available in terms of mainframe operating systems, we recommend that you run your analysis under the VM/CMS operating system. There are several advantages for running statistical

software on VM/CMS. Those advantages include:

- All of the above software can be run interactively on VM/CMS. In this environment, you will have a software interface similar to those of a microcomputer.
- Since the CMS operating system is interactive, all jobs submitted will be executed immediately.
- SAS users have the option to use both SAS/PC and SAS/CMS simultaneously. It is possible to submit your SAS/PC program to be executed on VM/CMS.
- With the implementation of TCP/IP on VM/CMS, users will have the ability to move data between PCs and the mainframe quickly. Therefore, a broader range of options can be selected.
- Finally, since VM/CMS is a mainstream operating system for IBM mainframes, software upgrades will be available on timely fashion. For example, SPSS-X version 4.0 and LISREL version 7 with the PRELIS program are now available for the CMS operating system but not for the OS/MVS operating system.

Conclusion

Many things can affect your decision to use a particular software package and environment. We hope that this article will help you to make an informed choice. If you have any questions about any of the issues raised here, feel free to contact me in the Computing Center (565-2324).§

Machine Readable Data Available at UNT

By Panu Sittiwong, Academic Computing Consultant (BITNET: PANU@UNTVM1)

The UNT Computing center has a wide variety of machine readable data available to all students and faculty members for research purposes. These data are acquired from several sources including the Inter-university Consortium for Political and Social Research (ICPSR), the Department of Labor, the Center for Research in Security Prices (CRSP), Standard and Poors (COMPUSTAT), etc. Additionally, by accessing the Internet through VAX/VMS, researchers can search and obtain the Louis Harris and Associates data holdings at the Institute of Research in Social Science (IRSS) at the University of North Carolina, Chapel Hill.

- **CRSP Data:** Once a year, UNT receives data from the Center for Research in Security Prices. These data include:
 - * Monthly NYSE and AMEX Returns and Master file
 - * Daily NYSE and AMEX Returns file
 - * Daily NASDAQ Returns and Master file
 - * Daily, Monthly, Quarterly, and Annual Markets Indices file
 - * National Market System Securities file
- **COMPUSTAT II Data:** UNT receives, once a year, new COMPUSTAT II data from Standard and Poors. The current holdings include:
 - * Annual Primary, Supplementary, and Tertiary (Industrial and Research) file
 - * Annual Over the Counter file
 - * Annual Bank file
 - * Annual Price, Dividends and Earning file

Additionally, we are in the process of acquiring some quarterly data.

- **ICPSR Data:** Data from ICPSR constitute the majority of data archives at UNT. Currently, there are more than 200 data titles available locally at UNT. As a member of the Consortium, UNT students and faculty members can request any data available from the ICPSR. Data available from ICPSR cover a wide range of subjects and disciplines including Public Opinion Surveys, Election Studies — both the US and foreign countries, Congressional Roll Calls, General Social Surveys, Health Interview Surveys, Consumer Expenditure Surveys, Government Finance, World Economic Indicators, Population Surveys, Census for the US and many foreign countries, EURO-BAROMETER, and much more.

You can search and locate ICPSR data holdings available at UNT by issuing the command FINDICPSR from the prompt on either MUSIC/SP or VM/CMS. If the data that you need are not available at UNT, you can request them by contacting me at ext. 2324, or by sending electronic mail to PANU on CMS or AC09 on MUSIC. It may take up to 4 weeks before the data can be accessed when it is ordered from ICPSR.

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- **Louis Harris & Associates Data:** In addition to the abovementioned data, any researcher with access to the Internet can now search the Louis Harris and Associates data holdings at the Institute of Research in Social Science (IRSS) at the University of North Carolina, Chapel Hill. Keywords in combination can be used to locate items of interest. Soon the search will also display frequency distributions for each question retrieved.

IRSS Data Services can be reached by accessing the Internet from the UNT VAXcluster. The Internet address for UNCV1 is:

UNVM1.ACS.UNC.EDU

or

128.109.157.5

After logging on the VAX, to connect to UNCV1, type:

TN3270 UNVM1.ACS.UNC.EDU

or

TN3270 128.109.157.5

When you connect to UNCV1, you'll see the standard VM logon banner. Type:

IRSS1

or

IRSS2

at the Logon line. The system will prompt you for a password. The password is IRSS. You will now logon to the Computer at University of North Carolina, Chapel Hill. The procedures should be self-explanatory from this point on. Please note that since this data archive is available on a remote computer system, Academic Computing Services can assist you only on a limited basis. §



The Computing Center is offering the following short courses for the fall 1990 semester. Please pre-register to attend (a registration form can be found at the end of this issue). A maximum of 10 people will be admitted to each of the courses held in ISB 110. A maximum of 7 people will be admitted to each of the courses held in the Graphics Lab. A maximum of 8 people will be admitted to each of the courses held in ISB 123.

PLEASE NOTE: Faculty and students have first priority to register for these classes.

MAINFRAME COURSES

1. **Introduction to MUSIC/SP :** Introductory sessions to MUSIC/SP will be held in Room 110 of the Science Library (ISB) on a bi-weekly basis. **NO PRE-REGISTRATION IS REQUIRED FOR THESE COURSES.** Consult the HELP DESK (565-4050) for a schedule of classes and/or to request a class on a specific day. All courses will be taught by Help Desk staff.
2. **Introduction to IBM Job Control Language:**
Two separate two-hour sessions to be held in the Academic Computing Conference Room (ISB 123):
 - Monday, September 17: 3:00-5:00 p.m. Instructor: Geroge Morrow
 - Monday, October 15: 5:30-7:30 p.m. Instructor: Cathy Hardy
3. **Introduction to SAS:**
Two separate three-hour sessions to be held in the Science Library (ISB 110):
 - Friday, October 5: 1:00-4:00 p.m. Instructor: Panu Sittiwong
 - Thursday, November 1: 2:00-5:00 p.m. Instructor: Panu Sittiwong

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4. Introduction to SPSS-X:

A two-hour session to be held in the Academic Computing Conference Room (ISB 123):

- Thursday, October 4: 3:00-5:00 p.m. Instructor: Panu Sittiwong

5. Introduction to CMS:

Three two-hour sessions to be held in the Science Library (ISB 110). Additional courses may be scheduled through the HELP Desk, just as with the MUSIC/SP courses:

- Tuesday, October 2: 3:00-5:00 p.m. Instructor: Philip Baczewski
- Monday, October 8: 3:00-5:00 p.m. Instructor: Philip Baczewski
- Monday, October 29: 5:30-7:30 p.m. Instructor: Cathy Hardy

6. Introduction to VAX/VMS:

A two-hour session to be held in the Science Library (ISB 110):

- Tuesday, September 18: 1:30-3:30 p.m. Instructor: Staff

7. Introduction to BITNET:

A two-hour session to be held in the Academic Computing Conference Room (ISB 123):

- Thursday, October 11: 3:00-5:00 p.m. Instructor: Philip Baczewski

8. Introduction to the Internet and THENET:

A two-hour session to be held in the Academic Computing Conference Room (ISB 123):

- Wednesday, September 26: 3:00-5:00 p.m. Instructor: Billy Barron

MICROCOMPUTER COURSES

1. Introduction to Microcomputer Labs: ISB 110, Willis Library, Graphics Lab:

Five separate one-hour sessions to be held in the Science Library (ISB 110):

- Monday, September 10: 2:00-3:00 p.m. Instructor: Staff
- Wednesday, September 12: 9:00-10:00 a.m. Instructor: Staff
- Tuesday, September 18: 10:00-Noon Instructor: Staff
- Thursday, September 20: 5:00-6:00 p.m. Instructor: Staff
- Tuesday, September 25: 3:00-4:00 p.m. Instructor: Staff

2. Introduction to Microsoft Word:

Two separate two and 1/2 hour sessions to be held in the Graphics Lab (ISB 6):

- Dates and times to be announced. Instructor: Pro Systems Staff

3. Advanced Microsoft Word:

A two and 1/2 hour sessions to be held in the Graphics Lab (ISB 6):

- Dates and times to be announced. Instructor: Pro Systems Staff

4. Introduction to Hypercard:

Two separate two and 1/2 hour sessions to be held in the Graphics Lab (ISB 6):

- Dates and times to be announced. Instructor: Pro Systems Staff

5. Introduction to WordPerfect 5.1:

A three-hour session to be held in the Science Library (ISB 110):

- Friday, October 12: 1:00-4:00 p.m. Instructor: Sandy Franklin

6. Introduction to Electronic Spread Sheets:

A two-hour sessions to be held in the Science Library (ISB 110):

- Tuesday, October 23: 3:00-5:00 p.m. Instructor: Staff

7. Introduction to Procomm+:

Three one-hour sessions to be held in the Academic Computing Conference Room (ISB 123):

- Thursday, September 13: 3:00-5:00 p.m. Instructor: Staff
- Friday, September 21: 2:00-3:00 p.m. Instructor: Staff
- Monday, October 1: 1:00-2:00 p.m. Instructor: Staff

8. Introduction to SAS PC:

A three-hour session to be held in the Science Library (ISB 110):

- Monday, October 22: 2:00-5:00 p.m. Instructor: Panu Sittiwong

9. Introduction to SPSS PC +:

A three-hour session to be held in the Science Library (ISB 110):

- Thursday, September 27: 2:00-5:00 p.m. Instructor: Panu Sittiwong

Computing Center Open House Scheduled for September 20, 21

Each semester the Computing Center provides tours of our facilities. If you are interested in participating in a tour, call 565-2324 for reservations and more information. Tours will begin at 9 a.m. and will be conducted at 30 minute intervals. Maximum tour size is 10 people.

NSFNET Acceptable Use Policy Summary

By Billy Barron, VAX/Unix Systems
Manager (BITNET: BILLY@UNTVAX)

This summer, the National Science Foundation issued an Acceptable Use Policy for the NSFNET, the part of the Internet we belong to. Though the policy itself was fairly short in its own right, I have condensed it even more and attempted to interpret it in regard to local issues. The policy is summarized as follows:

1. The purpose of the NSFNET is to support research and education in and among academic and non-profit institutions in the United States by providing access to unique resources and opportunity for collaboration. For UNT, this clause basically says that any research or institutional use of the network is acceptable for faculty and students of our university.
2. Administrative activities allowed in direct support of an institution described in item #1. This allows UNT staff members to use the NSFNET to support the university.
3. Commercial users can only use the NSFNET to support research and instructional projects at institutions described in item #1.

The National Science Foundation generally has taken a broad view of appropriate usage. However, if problems arise, then they may tighten their policies. Some examples of inappropriate use:

Continued on page 30.

THE BITNET CONNECTION

By Philip Baczewski, BITNET INFOREP (BITNET: AC12@UNTVMI)

*This Column is a continuing feature of **Benchmarks** intended to present news and information on various aspects of the BITNET wide area network.*

You Can't Do That . . .

What You Can't do on BITNET

This past July, I had the privilege of attending a seminar on using the NeXT computer for musical composition, held at the Center for Computer Research in Music and Acoustic at Stanford University. This necessitated my being away from the office for four weeks. Not wanting to be out of touch for that entire period, I explored various ways to maintain contact with my local computing environment from a site as far away as Denton is from Stanford. In this case BITNET was not the answer. By using the Internet however, I was able to log onto our local VAX computer from Stanford and, through a special arrangement, even use the PC in my UNT office from Stanford.

The Internet is a collection of research, educational, and commercial networks which are tied together by the TCP/IP networking protocol. It differs from BITNET in that it is primarily an end-to-end network rather than a store-and-forward network like BITNET (more on store-and-forward later). When you use the Internet, you establish a communications link which, for all practical purposes, is a direct connection between your local computer and the remote computer. This end-to-end technology supports an entirely different type of networking activity than does BITNET. With an end-to-end connection, you can have an interactive session, either to "get" a file or, if you are an authorized user of a remote machine, actually log on and use that computer from a remote location.

Any computer which runs the TCP/IP networking protocol and is attached to the Internet can potentially sign onto any other computer on the Internet. From the PC in my office, I can potentially log on to any computer on the Internet. My USERID on the VAX 6310 computer here on campus also provides the same type of Internet connectivity. Likewise, from any other computer on the Internet, I can log onto the VAX 6310 using my USERID, and I can establish a file-transfer connection with my PC if it is set up to support a TCP/IP session. This was a great benefit in keeping in touch with my UNT activities while I was studying at Stanford.

What You CAN do on BITNET

The Internet sounds like the ideal computer network until you start realizing what you *can't* do. The Internet does not support unattended file transfer, like the CMS SENDFILE or the VAX SEND/FILE commands, or an interactive message sending facility like the CMS TELL or the VAX SEND commands. BITNET does these

both very easily and efficiently. The difference is found in the type of network protocol used by BITNET.

BITNET is based upon IBM's RSCS protocol. It is a store-and-forward technology, in which many computers can be connected in series. When one computer sends a message to another on BITNET, that message is sent to the next computer in the series which stores a copy and sends it on to the next computer in the series. This process is repeated until the message is received at the destination computer. Because an end-to-end connection is not possible, remote log-on to other computers is not possible on BITNET. The unattended passing of files, mail, or messages is very easy on BITNET, however, because the only direct connections are between computers in the series. There is not the need to support a potential connection to any computer on the network.

In sending mail and files, store-and-forward technology offers another advantage. If a link goes down while you are performing a TCP/IP file transfer, your session is interrupted and you have to wait until that link comes back up in order to start your session again. If you send a file on BITNET and a link goes down, the file is stored until that link is restored and then forwarded automatically.

Each network has its strengths and weaknesses. Perhaps the ideal network would be one that combines both types of functions. This idea is more than speculation. There are currently locations on BITNET which run the RSCS protocol over TCP/IP connections as part of the experimental BITNET II project. This combination yields the potential for both the end-to-end ability of TCP/IP and the store-and-forward functions of BITNET. The practical implementation of this configuration throughout the BITNET network may take a long time, since it requires each computer to support both RSCS and

TCP/IP. Of UNT's central host computers, only the VAX 6310 currently has the ability to connect to the Internet. The VAX VMS system and the IBM interactive systems, MUSIC and VM/CMS, all have connections to BITNET. The planned installation of TCP/IP on the VM/CMS system will bring maximal wide area connectivity to that system as well. §

"NSFNET" continued from page 29

1. Chain letters
2. Commercial advertising. To suggest a commercial product is acceptable, but to try to sell it is a violation of the policy.
3. Wasteful and/or abusive mail
4. Transferring pirated software or documents

In the past, UNT's users, in general, have not caused problems. We need to keep up the good work because the NSFNET is too valuable tool for the university to abuse. §

LIST of the Month

Each month we will highlight one of the BITNET LISTSERV Special Interest Group (SIG) mailing lists. This month's list...

FRAC-L@GITVM1

Coordinator: Michael Burtz CCASTMB@GITVM1

FRAC-L is a network mailing list which deals with the Computer-graphical generation of fractal images. An archive of submissions and fractal-generating programs will be maintained.

Fractal Geometry was developed by Benoit Mandelbrot and has been used to help describe and simulate structures in nature ranging from trees to mountain ranges. Computers have played a key role in the study of this new branch of geometry by generating graphical images illustrating various theoretical components of this field of study. The images generated in this fashion have intrigued artists and computer enthusiasts across the board. To subscribe to this mailing list send the following command as the first line of a mail message or as an interactive message to LISTSERV@GITVM1:

SUB FRAC-L <firstname lastname>

Introduction to Microcomputer Support Services

By Kyle F. Capps, Manager of Microcomputer Support Services

During the past two years, the University of North Texas has dramatically increased the use of microcomputers, facilitating the expansion of computing at this university. At the present time, over two thousand microcomputers are used by faculty, staff, and students on the UNT campus. Additionally, UNT has the largest single Novell network installation of any educational institution in the state of Texas. This network consists of over forty Novell file servers, connecting approximately 1,000 microcomputers. The Novell file servers are connected to a single broadband backbone, thereby facilitating the communication between servers and also between servers and host computing systems. Gateways from the Novell internet are provided to facilitate communications with the academic mainframe, VAX system, library card catalog system, and the administrative mainframe.

Microcomputer Support Services, a division of Academic Computing Services, provides technical assistance on microcomputer software to the University community in support of the increasingly complex microcomputer environments. The services provided by the Microcomputer Support staff include support of selected applications software packages, technical support of the Novell networks and Novell gateways, administration of the WordPerfect and Procomm site license agreements, management of the Graphics and Willis Library student access labs, microcomputer training for faculty, staff, and students through the Personnel Office and Academic Computing Services, and assisting faculty and staff in selecting the necessary hardware and software to solve instructional, research, and office automation needs.

In an effort to provide the best support to the University community, we concentrate our effort on providing the best support for the most popular software applications on campus. Collectively these applications packages comprise the Microcomputer Supported Items List. The absence of a particular software product does not necessarily mean that support is unavailable. We will try to provide support to unsupported items within certain guidelines: (1) the problem receives a lower priority than all current supported items, (2) the person trying to resolve the problem has no outstanding trouble calls of supported items, and (3) if the problem will require an excessive amount of a staff members time, we reserve the right to refuse the trouble call. These refusals are determined by the Manager of Microcomputer Support.

Software Support Items

I. IBM PC Compatible Supported Software

- WordPerfect Products
 1. WordPerfect 5.0, 5.1 (Stand-alone & Network)
 2. PlanPerfect 5.0, 5.1 (Stand-alone & Network)
 3. WordPerfect Office 2.0, 3.0 (Network)
 4. WordPerfect Library (Stand-alone)
 5. DrawPerfect ver. 3.x (Stand-alone & Network)

- Communications
 1. Procomm/Procomm Plus
 2. PCWS
 3. Kermit
 4. ITI Coax Emulation Software
- Utilities
 1. Norton Utilities
 2. PC Tools
 3. Fastback
 4. Everex Tape Backup Software
 5. LAN Assist (Network)
 6. Map Assist (Network)
 7. LAN Spool (Network)
 8. Printer Assist (Network)
- Miscellaneous
 - Dbase III-Plus, Dbase IV (Stand-alone & Network)
 - Lotus 1-2-3 ver 2.1, 2.2 (Stand-alone & Network)
 - Novell Netware ver 2.15 & 386 (Network OS)
 - PC/MS DOS 3.x & 4.xx

II. Macintosh Supported Software

- MicroSoft Word
- MicroSoft Works
- WordPerfect
- Hypercard
- SuperPaint

To obtain software support from Microcomputer Support, we now provide a technical support telephone line administered by a full time staff member to insure that all trouble calls are logged into the system for proper and timely responses. To request technical support, please call 2316/2319 to request a trouble call be placed for assistance. If no one is currently available, someone will return your call as soon as possible. §

Discount Purchase of WordPerfect 5.1

By Sandy Franklin, Microcomputer Support Services

Students, faculty and staff members at the University of North Texas have an opportunity to purchase full-blown copies of WordPerfect 5.1, PlanPerfect 5.1, DrawPerfect, DataPerfect and Office PC for IBM and IBM compatible computers directly from WordPerfect Corporation at prices far below retail. Forms to purchase WordPerfect products are available in the Computing Center main office located in room 119 of the Information Sciences building.

IBM versions of WordPerfect 5.1, WordPerfect 5.0, WordPerfect 5.0 for OS/2, PlanPerfect 5.0, DrawPerfect 1.1, and Office PC are available at a cost of \$135.00. WordPerfect is also available for the Apple IIe/IIc, and Apple IIGS for \$59.00; WordPerfect for the Amiga costs \$89.00; WordPerfect for the Atari ST costs \$89.00; and the WordPerfect for the Macintosh costs \$99.00. Shipping costs are outlined on the order blank.

You need to make a photocopy of your current Student ID or Faculty/Staff card and a photocopy of some well-known form of identification displaying your social security number, such as your driver's license or social security card. This and the form is then mailed directly to WordPerfect Corporation School Software Program. WordPerfect Corporation will hold this information strictly confidential and use it only to guard against duplicate purchases.

Continued on page 33.

Student Software Available at the University Store

Contributed by the staff in the text book section of the University Store

The University Store carries student editions of popular software in the trade book department. All editions require at least DOS 2.0 or higher and run on IBM or 100% compatible microcomputers. All software is on 5.25" diskettes and on 3.5" diskettes when available. Prices are subject to change due to publisher price increases. The following student editions are currently available:

- **LOTUS 1-2-3 Release 2.2 (\$49.95)** — Spreadsheet, graphics and database; full file compatibility with Lotus 1-2-3 Version 2.01. This edition offers 256 columns by 8192 rows. Requires 256KB RAM and one double density disk drive.
- **dBASE IV (\$46.95)** — Features a Control Center which allows data definitions and entry, query and report generation without writing programs. Fully compatible with dBASE IV. Requires DOS 3.1 or higher, 640KB RAM, one 360KB minimum floppy drive and hard disk. Limited to 120 records per file.
- **FRAMEWORK II (\$50.95)** — Multifunction software including word processor, spreadsheet, data management, business graphics, outlining, and Fred, a programming language. Requires 512KB RAM, two floppy drives or a hard drive, MS-DOS 2.11.
- **R:BASE for DOS Trial Pack (\$38.95)** — Relational database management system. Limited to 50 rows. Requires 512KB RAM and hard disk.
- **MINITAB (\$43.95)** — Statistical software; allows manipulation of up to 2000 datapoints. Includes basic statistics, descriptive statistics; arithmetic and transformations, scatter plots, box plots, histograms. On-line help requires 320K RAM, two disk drives.
- **SPSS/PC+ Studentware (\$37.25)** — Statistical software, includes the following procedures: Frequencies, Crosstabulations, Means, Correlation, T-tests, Non-parametric tests, Analysis of Variance Techniques, Simple and Multiple Regression, and Plots. Maximum of 20 variables allowed, cases limited by amount of available disk space. Requires two floppy disk drives or a hard disk and 512K RAM.
- **QUATTRO (\$37.25)** — A spreadsheet fully compatible with Lotus 1-2-3 and dBASE. Understands 1-2-3 macros, files, and keystrokes. 100 built-in financial and statistical functions. Supports 8087/80287 math coprocessors, Hercules, EGA, CGA, and VGA graphics adapters. Has pop-up menus, is not copy protected. Requires two floppies or a hard disk, 512KB RAM.
- **SMARTWARE (\$57.95)** — Contains wordprocessor, limited to 20 page document; Database Manager, limited to 500 records per file; Spreadsheet, limited to 256 rows and 64 columns per worksheet. You may import Lotus files. Also has time manager, communications, project processing, formulas and functions.
- **ISP: Interactive Statistical Programs (\$46.95)** — Contains various popular statistical routines. Requires two floppy disk drives or a hard disk, 384KB RAM.

- **TURBO PASCAL 5.5 (\$54.95)** — State-of-the-art object-oriented program, fast, integrated environment tutorial, hypertext help, 448KB RAM, one floppy drive.
- **AUTOSKETCH 2.0 (\$43.95)** — Powerful computer-aided design, pull-down menus, full CAD geometry creation and manipulation, ten layers to draw, text capability. 512K RAM, two floppies or hard drive, CGA driver, ADI display device, Hercules Graphics Card. Mouse recommended.
- **MICRO-LOGIC II (\$38.50)** — Integrated interactive electronic drafting and simulation program. Performs CAD drafting and logic simulation. Required: 512K RAM, hard disk drive or two 360K or larger floppy, DOS 3.0, mouse, CGA or Hercules graphics card.
- **WORDBENCH (\$42.50)** — Tool for people who write. Full featured word processor, outliner, notetaker, reference tool for recording sources, fully integrated 60,000 word spell checker, 40,000 word Thesaurus, brainstormer.
- **TUTORIAL SOFTWARE FOR: WordPerfect, DOS, dBASE, and Lotus** — prices range from \$24.95 to \$28.95.
- **TEMPLATES** for most software programs — prices range from \$2.95 to \$12.95.
- **Full line of COMPUTER REFERENCE BOOKS.**
- **SPECIAL ORDER BOOKS** — call Elida Tamez at 565-3185 for questions or suggestions. §

"Discount" continued from page 32.

If you are interested in purchasing WordPerfect products, be sure to take advantage of this cost saving offer available only to educational institutions. If you already own WordPerfect products, upgrade costs are also usually less than the advertised prices. §

Site License Available for WordPerfect Products

By Sandy Franklin, Microcomputer Support Services

Approximately two years ago, the University of North Texas entered into a site license agreement with WordPerfect Corporation to provide high quality microcomputer software at a very low cost to the University. The cost savings to the University have now exceeded \$94,000.00 over the more traditional educational pricing structure available from WordPerfect. Microcomputer Support Services currently manages the site license agreement to insure that the conditions of the agreement are met. This protects the University from any possible copyright or patent infringement charges.

SITE LICENSE PRICING IS AVAILABLE ONLY ON UNIVERSITY OWNED EQUIPMENT THAT REMAINS ON CAMPUS. Special pricing is available for personally copies. See the article on page 32 of this issue of *Benchmarks* regarding "Discount Purchase of WordPerfect" for more information. The products currently available on site license include:

- WordPerfect 5.1 (both new installs (\$23) and upgrades (\$5))
- WordPerfect 5.1 manuals (\$24)
- WordPerfect Office 3.0 (both new installs (\$23) and upgrades (\$5))
- WordPerfect Office 3.0 manual (\$24)
- DrawPerfect 1.1 (\$25)
- DrawPerfect manual (\$24)
- PlanPerfect 5.0 (\$25)
- PlanPerfect manual (\$40).

The UNT Interdepartmental Order Form for the WordPerfect Site License is available, upon request, from the Computing Center main office in Information Sciences Building, Room 119, or call 565-2324.

Changes to the latest IDO include information regarding the availability of the software on diskettes, either 5 1/4" or 3 1/2" low density. If the department provides the diskettes, there is no additional charge. If the Computing Center has to provide the diskettes, a charge of \$1.00 per 3 1/2" diskette and \$.50 per 5 1/4" diskette will be made. If the Microcomputer staff install the software on the equipment, a charge of \$35 per installation will be made.

The WordPerfect Site License Restrictions and Covenant reads as follows:

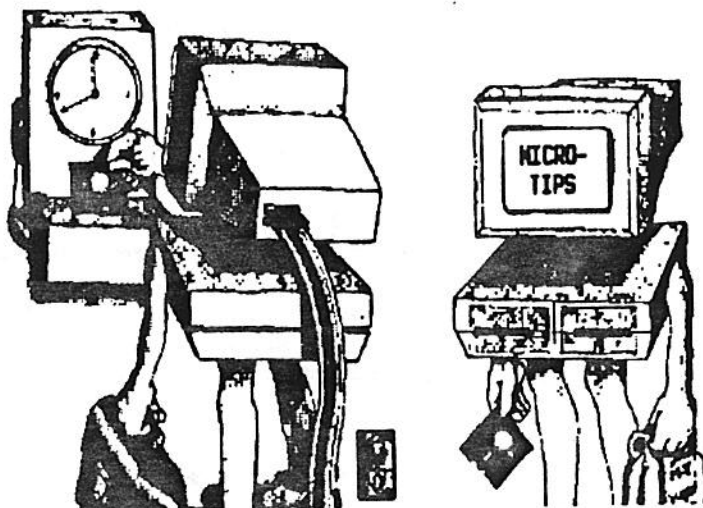
The software purchased with School Site Volume Pricing must remain the property of the school and may not be loaned, transferred, or resold to off-campus users. Software purchased under this agreement may be used only at official school sites and may not be used off-campus by anyone, including teachers, staff, and students. With proper identification, teachers, staff, and students may purchase personal copies of WPCORP micro software at educational discounts through participating school bookstores and local software vendors.

A school purchasing software under this program shall provide its own internal support and use its best efforts to inform everyone that may have access to one of its computers of the above restrictions. The school shall incur no liability for the unauthorized use or duplication of the software as long as this covenant is fulfilled.

This information supersedes any previous information regarding WPCORP's School Software Program. Prices and product descriptions are subject to change. For current information on any of these programs, call Microcomputer Support Services 565-2316.¶

Your HP LaserJet IIP May Need a New Power Supply

According to Hewlett Packard Corp., some HP LJ IIPs have faulty power supplies. Look for the serial number (on back of the printer, to the left of the power cord) and the manufacturing date (on the back of the printer, under the input ports). If the printer number begins with 2951J or greater or if the date is later than January 1990 or later, you don't have to worry. Call HP at (800) 233-5153 if your power supply needs to be replaced.¶



This column is intended to serve as a forum for sharing useful tips on making more productive use of microcomputers. If you have a tip that you feel may be of use to campus users, submit it to the Benchmarks editor for possible inclusion in a future issue.

Criteria for Adding Software to Novell Networks in Public Access Micro Labs

This is modified from an article, "Criteria for adding software to new Novell networks in public micro labs" that appeared in the December 1989 issue of Computing and Telecommunications at Kansas State University.

If you are a faculty member and have software you wish to make available in the public access labs (Willis Library, ISB 110 and Graphics) during the fall semester, you should contact Randy Bell at 565-2324.

Software installation requests will be handled on an individual basis and will be judged according to the following criteria:

- Compatibility with the Novell NetWare environment. This includes print considerations, the ability to protect the copyright of the software, and the resources the program requires (memory, disk space and network load).
- Software proposed to be installed must have an academic purpose and satisfy the other requirements. The requesting department must supply a cover letter explaining the proposed use of the software and its intended audience. Estimates of the size of the audience will be helpful in justifying the installation of the software.
- An original copy of the program and documentation must be submitted to Microcomputer Support Services for testing and approval. If the software is installed, these copies will remain with the Computing Center as long as the program is on the network. The program needs to be submitted at least 30 days in advance of the proposed installation date.

- A copy of the license agreement or proof of purchase of the software must be provided to the Computing Center. The license agreement must permit installation of the software in a network environment. However, if individual copies of software are required, a copy must be purchased by the department for each workstation on the network as well as a copy for the file server.
- Department-specific software must be supported by the department requesting installation. The department will supply the name, phone number, room number, and office hours of a contact person who will be able to answer questions on the usage of the software. Responsibility for support information will be posted in the public lab.
- For each lab where the software is to be installed, the requesting department must supply a copy of all documentation, instructions, and templates required. This material is to be maintained and replaced as needed by the requesting department.

Problems with Turbo Products and NET4

By Billy Barron, VAX/Unix Systems Manager (BITNET: BILLY@UNTVAX)

An unusual conflict has cropped up between some of Borland's Turbo products, such as Turbo Pascal, and a certain version of the Novell NET4 driver. When executing a program from within the integrated environment, the following message appears on the screen: "SYSTEM HALTED. SYSTEM DOES NOT SUPPORT RESIDENT BASIC". Once that happens, the only way to recover is to reboot the PC.

The version of NET4 which causes the problem is dated 5-19-89 and is 41764

bytes long. A newer version of NET4 exists dated 5-8-90 and is 48907 bytes in size. This 5-8-90 NET4 works correctly with Borland's product. The new NET4 is available on the CC1 server in the directory SYS:\LOGINSHELLS. All DOS 4.01 users who use a Borland product are advised to get the new version of NET4.

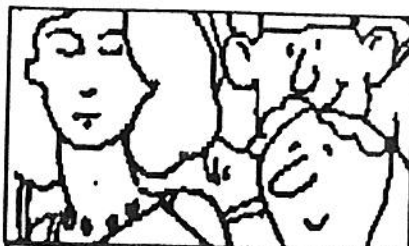
ASCII at Your Fingertips

This article originally appeared in the Summer 1990 issue of Turn-Around Times, the newsletter of Computing Services at the University of California at Davis. The author is Dave Patrick.

Picture this: It's late at night, and you're putting the finishing touches on the Pascal program that your boss or instructor wants first thing in the morning. As you reach for the reference manual to look up the alphanumeric symbol corresponding to a certain ASCII code, you inadvertently spill your coffee all over the page. "68-97-114-110!!" you exclaim (in ASCII, of course).

Although you can remember the letters corresponding to the codes of your favorite expletive, you just can't recall the ones you need for your Pascal program. Don't despair! Your DOS computer can show you the symbols easily and automatically. To see a particular ASCII code on the screen, just hold down the <ALT> key and, using the numeric keypad, type the numbers of the code. (The number keys across the top of the keyboard do not give you this feature). After you enter the digits (3 or less) of the code, release the <ALT> key and note that the appropriate alphanumeric symbol appears.

Unfortunately, no way exists to do the reverse operation, i.e., to find the ASCII code corresponding to a given alphanumeric symbol. §



BENCHMARKS FORUM

BENCHMARKS FORUM is intended to serve as a vehicle for answering questions that may be of general interest to the user community. If you have a question, please send electronic mail to the Benchmarks editor (BITNET: AS04@UNTVM1) or write it down and drop it by the Computing Center. We will try to answer it in the next issue.

Question: What ever happened to that "Software Rental Bill" that was causing such a panic in higher education awhile back?

Answer: We had been wondering about that too. It turns out that the U.S. Senate Judiciary Committee, at a March 8, 1990 meeting, unanimously approved the Computer Software Rental Amendment Act of 1989 (S.198), with an exemption for non-profit educational institutions. This exemption was proposed by Senator Orrin G. Hatch (R-UT), who is the original sponsor of S.198, an amendment to the Copyright Act to control illegal copying of software.

The modified bill has been forwarded to the full Senate for consideration. §

Benchmarks Reader/User feedback is encouraged. Send all letters, suggestions, etc to (AS04@UNTVM1), FAX 817-555-4060 or to the Benchmarks Editor at:

Academic Computing Services
University of North Texas
Computing Center
NT Station,
Box 13496
Denton, Texas 76203



VAXCLUSTER USAGE STATISTICS

June Top Ten Programs: CPU Time Used

Program	Description	CPU Time	Percent of Total
1. User programs	Compiled Programs	16 06:31:34.87	75.2
2. NEWS	ANU News Utility	1 07:56:33.68	6.1
3. LISP	Lisp Interpreter	0 11:55:45.62	2.3
4. BACKUP	Disk Backups	0 09:50:12.05	1.9
5. NNTP_TCPWIN	News Transfer Utility	0 07:11:59.36	1.4
6. EDT	Editor	0 06:27:58.39	1.2
7. ADA	ADA Compiler	0 03:44:18.10	0.7
8. MAIL	VMS Mail	0 03:43:37.38	0.7
9. ARC	Archive Program	0 03:43:07.18	0.7
10. LOGINOUT	User login	0 03:18:58.58	0.6
Total		21 15:38:10.10	

June Top Ten Programs: Frequency of Runs

Program	Description	Number of Runs	Percent of Total
1. LOGINOUT	User login	52802	15.0
2. DELETE	VMS Utility	39250	11.2
3. SET	VMS Utility	38832	11.0
4. User programs	Compiled Programs	36749	10.4
5. DIRECTORY	VMS Utility	32405	9.2
6. EDT	Editor	19126	5.4
7. SEND	Bitnet Message Utility	13948	4.0
8. TYPE	VMS Utility	12934	3.7
9. SYSLOGIN	User Login	10209	2.9
10. LINK	Linker	7688	2.2
Total		351932	

July Top Ten Programs: CPU Time Used

Program	Description	CPU Time	Percent of Total
1. User programs	Compiled Programs	20 13:59:46.75	77.1
2. NEWS	ANU News Utility	1 11:11:43.14	5.5
3. LISP	Lisp Interpreter	1 01:17:49.67	3.9
4. BACKUP	Disk Backups	0 10:04:06.88	1.6
5. EDT	Editor	0 08:27:31.59	1.3
6. NNTP_TCPWIN	News Transfer Utility	0 07:56:43.30	1.2
7. PASCAL	Pascal Compiler	0 07:06:26.52	1.1
8. DISKKEEPER	Disk Optimizer	0 05:03:43.50	0.8
9. LOGINOUT	User login	0 04:51:38.51	0.8
10. MAIL	VMS Mail	0 03:54:38.50	0.6
Total		26 16:38:14.39	

Icon See What You Mean

By Claudia Lynch, Benchmarks Editor
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If you're going to use electronic mail systems, join electronic discussion groups, communicate via BITNET and the Internet or do anything else that requires electronic communication, you need to know about icons. The origin of icons can be traced to an article in *Science News* (August 15, 1984, pp. 122-124), in which it was claimed that statements made electronically are often misunderstood because they don't convey normal cues about emotional content (i.e., body language and vocal inflection). The lack of such information can lead to misunderstandings. Statements meant to be sarcastic are taken literally, for example. To combat this situation, people began using "icons" and other abbreviated indicators to show intent of a message, inflection or emphasis. Most people are aware of the more common ones. For example, parenthetical expressions of emotion (SIGH), (GASP); bracketed text for expressing strong opinions:

FLAME ON:

:

strong opinions

:

FLAME OFF:

Emphasis can be added to words or phrases by enclosing them with asterisks, as in "I am *not* going to change that program again."

Gradually things have progressed so that the more symbolic icons are now interspersed freely in many people's electronic exchanges. Following is a brief offering of some of these icons. To get the full impact of the icons, you should read them sideways.

VAX COMPUTER CLUSTER

:-) Happy face.
 :-(Unhappy face.
 :-<) Smiling man with mustache
 ^-) Wink
 :-(Dracula!
 %-} Drunken with laughter
 :-" Pursing lips
 :]v Another face speaking, profiled from the side
 :]w Speak with forked tongue
 :]r Bleahh (sticking tongue out)
 :]l Smirk
 <:]0 Eek!
 :]* Oops (covering mouth with hand)
 :]T Keeping a straight face, tight -lipped
 :]D Said with a smile!
 :]O Shouting
 :]i Smoking
 :]l Disgusted
 :](Unhappy
 :]c Real unhappy
 :]C Just totally unbelievable! (jaw dropped)

July Top Ten Programs: Frequency of Runs

Program	Description	Number of Runs	Percent of Total
1. User programs	Compiled Programs	88087	21.3
2. LOGINOUT	User login	76075	18.4
3. SET	VMS Utility	33958	8.2
4. DELETE	VMS Utility	28884	7.0
5. DIRECTORY	VMS Utility	27067	6.5
6. EBT	Editor	21115	5.1
7. SEND	Bitnet Message Utility	17278	4.2
8. TYPE	VMS Utility	12318	3.0
9. PASCAL	Pascal Compiler	12213	2.9
10. SYSLOGIN	User Login	11190	2.7
Total		414513	

:]< Forlorn
 :]B Drooling
 :], Smirk
 :]? Licking your lips
 @-) Smiling cyclops
 <:]== Turkey
 :~0 Wow!
 :~0 Bigger and better Wow!
 :~l Grim
 :~H Anger
 :~l Baboon
 >-(Displeasure
 :~\$ Put your money where your mouth is
 -(Can't see what's going on
 :~' Frenchman (speaks wiz ze accent)

:-& Tongue-tied
 8-) Smily glasses-wearer
 i-) Detective (private eye)
 .-) Keeping an eye out
 &-) Theatre patron (with opera glass)
 3:=9 Bull: the 3 is the horns and the 9 is the mouth saying moo.
 :->) Smiling person with beard
 :-# My lips are sealed.

Now that you know the lingo, next time you decide to shoot the 3:=9 even if its with a :=l or a <:]==, just remember to "show some emotion." ^-) ^-) know what I mean?

Much of the material in this article came from an article in V/UPDATE, "Electronic Mail/Conference Icons," Vol. 8, No. 1, February 1990. Melinda Varian of Princeton University, Chris Thomas of UCLA, and Paul Zamowski and Larry Chase of Cornell University are credited with this list. §

COMPUTING TECHNICAL SERVICES

Mainframe Performance Statistics

Operating Systems Performance Statistics for June

CPU	SYSTEM	Planned Production Hours	Production Hours Achieved	System Uptime
ACAD	VM/XA2	720.00	605.52	84.1%
ACAD	VM/SP5	720.00	655.92	91.1%
ACAD	MUSIC/SP	688.13	622.66	90.5%
ACAD	MVS/JES2	720.00	647.04	89.9%
ACAD	COMPLETA	708.77	643.55	89.5%
ADMN	MVS/JES2	720.00	708.27	98.4%
ADMN	COMPLETA	290.00	288.06	99.3%
ADMN	ADABASA	694.17	680.54	98.0%

- The ACAD CPU achieved 100% uptime in June.
- The HDS/7360 DASD achieved 100% uptime in June.
- The HDS/7380 DASD achieved 100% uptime in June.
- The ADMN CPU achieved 100% uptime in June.
- The HDS/7360 DASD achieved 100% uptime in June.
- The HDS/7380 DASD achieved 100% uptime in June.
- The EMC Solid State Disk achieved 100% uptime in June.

Key Causes Of Lost Productivity In June: ADMN CPU

CPU, Tape, and Disk Subsystems (HDS)

1. I/O initiate and device failures in multiple tape drive addresses. **4.83 HOURS**

Miscellaneous

1. Systems software development. **5.40 HOURS**
1. Operator mistakes in systems restarts. **3.09**
2. COMPLETA system failures. **0.52**

TOTAL 9.01 HOURS
GRAND TOTAL 13.84 HOURS

Key Causes Of Lost Productivity In June: ACAD CPU

CPU, Tape, and Disk Subsystems (HDS)

1. Research and analysis of abortive attempts to run VM/SP in 32 megabytes under VM/XA. **9.92 HOURS**
 2. Installed microcode patch in the 8083 MPU to circumvent failure of VM/SP to run in 32 megabytes under VM/XA. **4.18**
 2. Installed microcode patches in the 8083 MPU's I/O processors to satisfy field change levels. **1.15**
- TOTAL 15.25 HOURS**

Miscellaneous

1. Suspended processing of VM/XA while analyzing cause of failures to run VM/SP in 32 megabytes under VM/XA. **56.55 HOURS**
2. Applying required system maintenance to VM/XA. **32.57**
4. Abortive attempts to run VM/SP in 32 megabytes under VM/XA. **5.40**

TOTAL 106.47 HOURS
GRAND TOTAL 121.72 HOURS

COMPUTING TECHNICAL SERVICES

Operating Systems Performance Statistics for July

CPU	SYSTEM	Planned Production Hours	Production Hours Achieved	System Uptime
ACAD	VM/XA2	744.00	720.80	96.9%
ACAD	VM/SP5	744.00	713.04	95.8%
ACAD	MUSIC/SP	706.76	672.01	95.1%
ACAD	MVS/JES2	744.00	707.88	95.1%
ACAD	COMPLETA	736.05	698.99	95.0%
ADMN	MVS/JES2	744.00	742.17	99.8%
ADMN	COMPLETA	324.00	324.00	100.0%
ADMN	ADABASA	713.43	711.48	99.7%

Key Causes Of Lost Productivity In July: ACAD CPU

CPU, Tape, and Disk Subsystems (HDS)

1. Upgraded microcode in the 8083 MPU to support 32 megabytes processing with VM/SP under VMXA. **5.80 HOURS**

Miscellaneous

1. Applying required system maintenance to VMXA. **20.91 HOURS**
2. Performing test runs with MVS/SP and MUSIC/SP under VMXA. **7.83**
3. Operator mistake in running MUSIC weekly backup. **2.67**
4. Systems software development **2.65**

TOTAL 34.06 HOURS
GRAND TOTAL 39.86 HOURS

Key Causes Of Lost Productivity In July: ADMN CPU

Miscellaneous

1. Systems software development **1.97 HOURS**

- The ACAD CPU achieved 100% uptime in July.
- The HDS/7360 DASD achieved 100% uptime in July.
- The HDS/7380 DASD achieved 100% uptime in July.
- The ADMN CPU achieved 100% uptime in July.
- The HDS/7360 DASD achieved 100% uptime in July.
- The HDS/7380 DASD achieved 100% uptime in July.
- The EMC Solid State Disk achieved 100% uptime in July.

ACADemic (HDS) Program Hit Parade

June Top Ten Programs : Frequency Of Runs

Program	Description	#of Runs	% of Total
1. IEBGENER	IBM Utility	6717	23.7
2. IEWL	Linkage Editor	3209	11.3
3. PGM=*.DD	Compiled Program	3190	11.3
4. SASLPA	SAS	2952	10.4
5. ADARUN	ADABAS Utility Module	2166	7.6
6. SPSSX	SPSS-X	2085	7.4
7. IGYCRCTL	VS COBOL2 Compiler	1101	3.9
8. CASMA001	Sort Utility	984	3.5
9. IKPCBL00	VS COBOL Compiler	767	2.7
10. SPCHLCOB	COBOL2 Report Writer	678	2.4

June Top Ten Programs: CPU Seconds Used

Program	Description	CPU Seconds	% of Total
1. PGM=*.DD	Compiled Program	69811	35.5
2. SASLPA	SAS	47293	24.0
3. SPSSX	SPSS-X	24910	12.7
4. COMPLET4	Academic COM-LETE	13797	7.0
5. ADARUN	ADABAS Utility Module	5759	2.9
6. IEHMOVE	IBM Utility	3570	1.8
7. IEBGENER	IBM Utility	3139	1.6
8. IGYCRCTL	VS COBOL2 Compiler	3113	1.6
9. RESOLVE	System Programming Tool	2434	1.1
10. IEWL	Linkage Editor	2205	1.1

The programs listed in this section were used the most frequently on the HDS ACADemic CPU during June and July, 1990. Please Note that ACAD is the official designation of the HDS/8083 CPU that is dedicated to faculty and student use. The HDS/8083 CPU reserved for University administrative purposes is termed ADMN.

COMPUTING TECHNICAL SERVICES

July Top Ten Programs : Frequency Of Runs

Program	Description	#of Runs	% of Total
1. IEBPTPCH	IBM List Utility	10853	20.4
2. IEWL	Linkage Editor	7459	14.0
3. PGM=*DD	Compiled Program	7379	13.9
4. IGYCRCTL	VS COBOL2 Compiler	4677	8.8
5. CASMA001	Sort Utility	4346	8.2
6. IEBGENER	IBM Utility	4135	7.8
7. SASLPA	SAS	3788	7.1
8. SPCHLCOB	COBOL2 Report Writer	1912	3.6
9. SPSSX	SPSS-X	1643	3.1
10. IKPCBL00	VS COBOL Compiler	1375	2.6

July Top Ten Programs: CPU Seconds Used

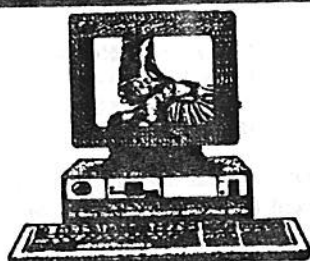
Program	Description	CPU Seconds	% of Total
1. SASLPA	SAS	104529	39.9
2. PGM=*DD	Compiled Program	49410	17.4
3. SPSSX	SPSS-X	24672	8.7
4. COMPLET4	Academic COM-LETE	18807	6.6
5. SSS4001	Operations Automation	15533	5.5
6. IGYCRCTL	VS COBOL2 Compiler	11820	4.2
7. SPCHLCOB	COBOL2 Report Writer	6431	2.3
8. IEWL	Linkage Editor	5628	2.0
9. ISTINM01	VTAM Utility	5589	2.0
10. RESOLVE	System Programming Tool	5052	1.8

Disk Backup Schedules

SYSTEM	BACKUP	DESCRIPTION
VAXcluster	Daily	Incremental backups are performed Monday - Thursday at 6 p.m. Saturday & Sunday at 5 p.m.
	Weekly	Full backups are performed every Friday beginning at 8 a.m. generally last all day.
	Monthly	A "stand alone" backup is performed monthly. Dates and times are given in the system log-on message.

Disk Backup Schedules

SYSTEM	BACKUP	DESCRIPTION
Administrative MVS/SP	Daily	Monday - Friday around 7 p.m. (after COM-LETE is shut down) & on Saturday & Sunday if COM-LETE has been up that day.
	Weekly	Full pack dumps taken each Sunday morning.
	Monthly	Full pack dumps taken on the first day of each month.
Academic MVS/SP	Daily	Monday - Sunday during the early hours of the morning.
	Weekly	Full pack dumps taken each Sunday.
	Monthly	Full volume dumps taken on the first day of each month.
MUSIC/SP	Daily	Wednesday - Monday starting at 4 a.m. and lasting about 30 minutes.
	Weekly	Tuesday mornings at 3 a.m., these last about 2 hours.
	Semester	Once a semester, a permanent backup is taken.
VM/XA	VM Weekly	Early every Wednesday morning.
	CMS mini-disks	Daily backup performed early every morning. Weekly backup every Wednesday starting at 3 a.m..
VAXcluster	Semester	Once a semester, a permanent backup is taken.



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___ Monday, September 17: 3:00-5:00 p.m.

___ Monday, October 15: 5:30-7:30 p.m.

● **Introduction to SPSS-X (ISB 123):**

___ Thursday, October 4: 3:00-5:00 p.m.

● **Introduction to BITNET (ISB 123):**

___ Thursday, October 11: 3:00-5:00 p.m.

● **Introduction to the Internet & THENET (ISB 123)**

___ Wednesday, September 26: 3:00-5:00 p.m.

● **Introduction to Procomm + (ISB 123):**

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___ Friday, September 21: 1:00-3:00 p.m.

___ Monday, October 1: 1:00-2:00 p.m.

● **Introduction to SAS PC (ISB 110):**

___ Monday, October 22: 2:00-5:00 p.m.

● **Introduction to Microcomputer Labs (ISB 110):**

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___ Wednesday, September 12: 9:00-10:00 a.m.

___ Tuesday, September 18: 10:00-Noon

___ Thursday, September 20: 5:00-6:00 p.m.

___ Tuesday, September 25: 3:00-4:00 p.m.

● **Introduction to SAS (ISB 110):**

___ Friday, October 5: 1:00-4:00 p.m.

___ Thursday, November 1: 2:00-5:00 p.m.

● **Introduction to VAX/VMS (ISB 110):**

___ Tuesday, September 18: 1:30-3:30 p.m.

● **Introduction to WordPerfect 5.1:**

___ Friday, October 12: 1:00-4:00 p.m.

● **Introduction to Electronic Spread Sheets (ISB 110)**

___ Tuesday, October 23: 3:00-5:00 p.m.

● **Introduction to CMS (ISB 110):**

___ Tuesday, October 2: 3:00-5:00 p.m.

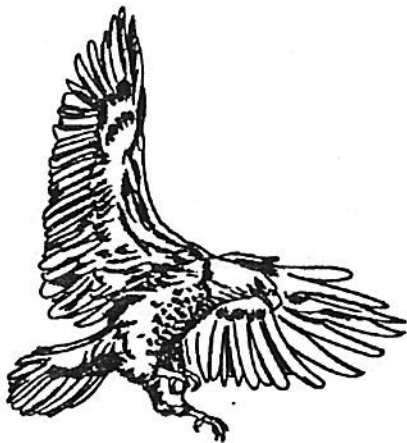
___ Monday, October 8: 3:00-5:00 p.m.

___ Monday, October 29: 5:30-7:30 p.m.

● **Introduction to SPSS PC+ (ISB 110):**

___ Thursday, September 27: 2:00-5:00 p.m.

I would like to see more classes offered: ___ on weekends; ___ at night.



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